JAN 11 1917
UNIV. OF MICH.

THE IRON TRADE REVIEW

Single Copies 15 Cents | CLEVELAND, JANUARY 11, 1917 | Four Dollars a Year

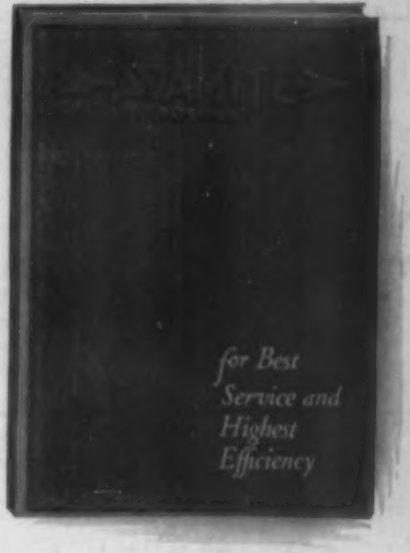
"Adamite makes Repair Bills Light"

"Adamite makes Profits Right"

Machining an "ADAMITE" Roll

IN this impressive photograph you can almost see the lathe tool turning up chips on the billet roll of ***"Adamite"***—the hardest material for roll service—and the right-hand neck shows the density and quality that make ***"Adamite"*** most efficient. ***"Adamite"*** insures continuous production with minimum cost for upkeep and repairs.

The recent addition of new foundry and machine shop equipment gives us greater facilities than ever to supply promptly ***"Adamite"*** Rolls —completely or partly finished, or in the rough; and other ***"Adamite"*** castings for use where maximum service is essential—dies, guides, pinions, gears, plungers, sand mills, etc.



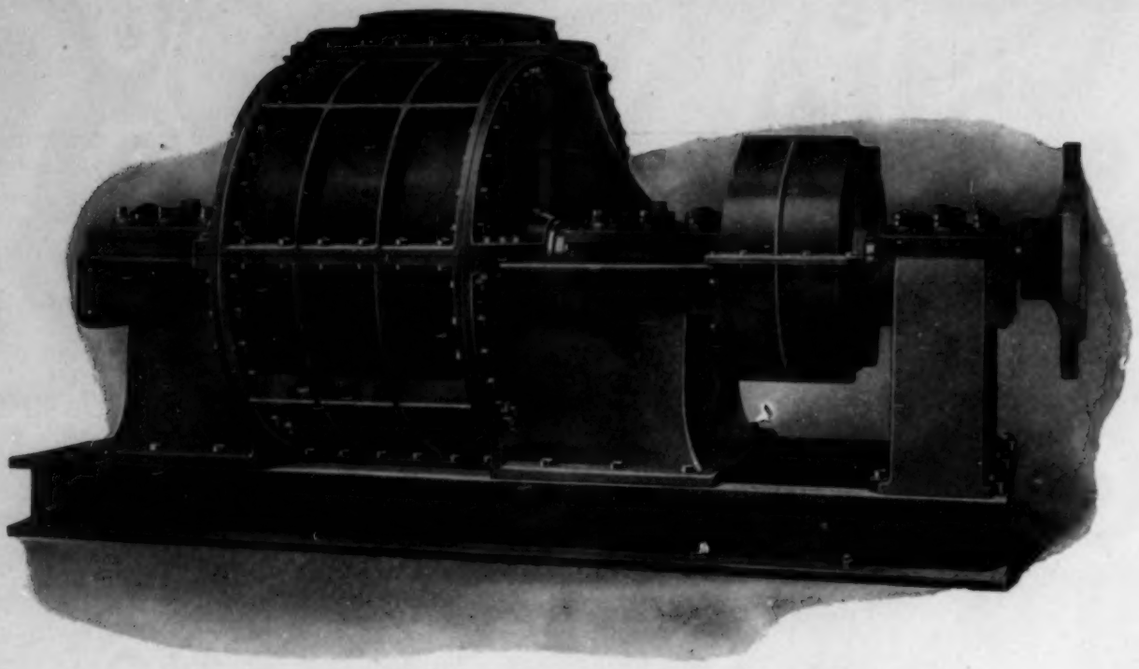
In the new *"Adamite"* book we describe the product and its many uses and explain why it will insure maximum efficiency in your plant—ask for a copy, and tell us which *"Adamite"* products you are particularly interested in at this time.

Pittsburgh Iron & Steel Foundries Co.

Foundries at Midland, Penna., U. S. A.

Executive and Sales Offices, Pittsburgh, Penna.

Alphabetical list of Advertisers, pages 152-153. Table of Contents, page 39. "Where-to-Buy," page 106.
Opportunities, pages 145-146. Second-Hand Machinery, pages 147-148-149. Manufacturing Sites, page 150.
Fill-in and Contract Work, pages 150-151. Engineering Directory, pages 136-137.



Connersville High Pressure Gas Pump

CONNERSVILLE
Gas Pumps, Exhausters and Boosters

CONNERSVILLE GAS PUMPS, EXHAUSTERS and BOOSTERS are exceptionally advantageous wherever gas is handled.

Altho they are the type of simplicity, they possess all the features of practical construction, resulting from years of experience.

CORRECT

The testimonials which we have received from users of CONNERSVILLE PUMPS, EXHAUSTERS and BOOSTERS, prove that "Connersville" products are correct both in design and service. Many state that they out-work as well as out-last the best pumps that they have ever been able to obtain.

EFFICIENT

Their range of capacity is from 25 to 40,000 cu. ft. per minute, and their pressure range is from ½ to 10 pounds. There is no lost motion—all motion is rotary, parts being carefully balanced and separated by accurately gauged clearances. There are no valves, no springs and no internal parts requiring lubrication.

SERVICEABLE

The service to which CONNERSVILLE PUMPS, EXHAUSTERS and BOOSTERS can be put, is almost unlimited. They can be used for handling air, gas, steam, water and all other fluids.

These pumps may be driven by belt, by direct connected steam engine, by electric motor direct connected or through gear and pinion, or by silent chain.

If you wish correct and efficient pump service write for a "CONNERSVILLE" catalog.

THE CONNERSVILLE BLOWER CO.

CHICAGO
929 Monadnock Bldg.

CONNERSVILLE, IND.

NEW YORK
114 Liberty Street

THE IRON TRADE REVIEW

Vol. LX Cleveland, January, 11, 1917 No. 2

Japan Places Large Plate Orders

Paying for Part of Tonnage Highest Price Yet Named—Russia and Other Foreign Countries Are Buyers of Cars—Domestic Demand Not Active

IN SPITE of the recent agitation in regard to peace, foreign demand continues to be a very important feature of the iron and steel markets and investigation shows that reports of new cancallations of orders for munitions are unfounded. The tremendous demand for plates for export continues and there it no prospect that it can be satisfied in the near future. One company made a sale of 20,000 tons of ship steel for Japan for delivery in the last half of the year at 6c, Pittsburgh, for the plates and 4c for the shapes, and later sold 4,500 tons of ship steel to Japan for first half delivery at 6.25c, Pittsburgh, for the ship plates and 4c for the shapes. This price for the ship shapes is the highest that has been paid to American mills. Japan is still in the market for a heavy tonnage, including 12,000 inquired for by a British merchant through his Montreal house. The Federal Export Corporation, New York, also is inquiring for 18,000 tons of ship plates for export. Another inquiry is for 15,000 tons of ordinary tank plates for construction purposes abroad other than ship building. The Laconia Car Co., Boston, is in the market for 17,000 tons of universal plates and about 3,000 tons of shapes to cover requirements for a Russian order for 4,000 cars, which the Boston company is closing. The Standard Steel Car Co. is also inquiring for a round tonnage of steel for car construction. For New York subway work, 6,100 tons will be needed. One eastern Pennsylvania company, which has been selling universal plates at 4c, Pittsburgh, now has orders for its capacity for six months and has advanced its price $15 per ton, or to 4.75c per pound, Pittsburgh. For sheared plates, 5c, Pittsburgh, is the usual quotation. Shapes are also extremely strong and some mills are quoting very high prices in order to avoid taking additional orders. An eastern steel company has received an order for 10,000 tons of shapes for cars recently placed by Russia. Important inquiries for structural material include large tonnages for government naval yards and Philadelphia subways.

Structural Bookings

Total bookings of structural work by the American Bridge Co. during 1916 were approximately 600,000 tons, or about 85 per cent of capacity. In the east, orders of this company approximated 200,000 tons and were the smallest since 1908. Because of reduced shop output caused by labor and material shortages, these booking, however, relatively were heavier than some other years where the actual figures were larger. The eastern division began the new year with practically as much unshipped tonnage as at the start of 1916.

Railroad Buying

Following the placing of orders for nearly 20,000 cars in December, domestic demand during the past week has been very quiet, but pending inquiries from American roads total about 5,000. Foreign railroads continue to inquire for a large number of cars. Another Spanish road has entered the market for 1,500 hoppers. Russian state railways are figuring with some of the builders on additional cars.

Traffic Congestion

In some districts, the railroad service has improved and a number of blast furnaces that were banked have resumed, but traffic embargoes are still causing serious embarrassment, especially to valley mills, where it is estimated that only about 60 per cent of the tonnage offered to the carriers is being handled. One company in the Pittsburgh district, which had 50,000 tons of finished material on hand awaiting cars and motive power, has reduced the tonnage to 30,000.

Shell Steel

Orders for shell steel pending or recently placed make a large volume. An inquiry for 30,000 tons of rounds from the Baldwin Locomotive Works has not been closed, while of recent orders for from 100,000 to 150,000 tons of shell steel, it is believed, a large part went to mills in the Youngstown district.

THE OPEN HEARTH

Dickson, the Radical---Discussion of His Address Invited

THE address delivered recently at Ohio State University by William B. Dickson, second vice president of the Midvale Steel & Ordnance Co. and former vice president of the United States Steel Corporation, published elsewhere in this issue, is a highly interesting and important document. Mr. Dickson is a man who knows what hard work is. He became, at an early age, an employe of the Carnegie Steel Co. and worked his way up to a very high position. In spite of his success in the acquirement of position and wealth, he never lost sympathy with the humble employes of the works, nor has he ever lacked courage to give expression to his convictions.

While the address shows very clearly that Mr. Dickson is a radical, it also demonstrates that he is fully aware that radical changes ought not to be made suddenly. Mr. Dickson, unlike some reformers, knows the practical side and he realizes, as he said at Columbus, that the average working man has a very hazy idea of how his employer earns his money and is likely to conclude that it is done almost as a sleight-of-hand performance. Mr. Dickson points out that factories are often kept running when the employers are staggering under burdens of debt, rather than see workmen suffer through idleness.

No one will be disposed to question that the invention of machinery is responsible for dreadful monotony in many jobs, but almost any job can be made a grind if the worker, or the shirker, helps to make it so. It is largely a matter of mental attitude. There are few positions which are not accompanied by features which can readily be rendered disagreeable, but it is likewise true that the worker has a great deal to do with making his task pleasing. If, as Mr. Dickson says, the factories could be located with more attractive surroundings, and if every employe could have a little home surrounded by several acres of land, it would be highly desirable, but Mr. Dickson must appreciate how extremely difficult it would be to bring about such conditions.

As to Mr. Dickson's twentieth century creed, many will assent to it as an ideal, but opinions will differ widely as to how to reach the ideal, especially as to dealing with the land question and other problems relating to natural resources.

Likewise in dealing with the seven-day week and the 12-hour day, the practical difficulties are clearly set forth by Mr. Dickson. With immigration suspended and great doubt as to the future supply of labor, it is not easy to reduce working hours, no matter how desirable reduction may be, and labor unions are not often disposed to compromise in the manner suggested by Mr. Dickson.

Mr. Dickson, in concluding, read Edwin Markham's poem, "The Man With the Hoe," and said that an enlightened social conscience has revolted against conditions whose inevitable consequences are so vividly set forth by the poet. If it be granted that the poet drew a truthful picture of the laborers of some lands at the time the verses were written, it is well to recall them to realize what progress has been made toward better conditions. Here is the black picture painted by the first two verses of the poem:

"Bowed with the weight of centuries he leans
Upon his hoe and gazes on the ground,
The emptiness of ages in his face,
And on his back the burden of the world.
Who made him dead to rapture and despair,
A thing that grieves not and that never hopes,
Stolid and stunned, a brother to the ox?
Who loosened and let down this brutal jaw?
Whose was the hand that slanted back this brow?
Whose breath blew out the light within this brain?

Is this the thing the Lord God made and gave
To have dominion over sea and land;
To trace the stars and search the heavens for power;
To feel the passion of Eternity?
Is this the dream he dreamed who shaped the suns
And pillared the blue firmament with light?
Down all the stretch of hell to its last gulf
There is no shape more terrible than this—
More tongued with censure of the world's blind greed—
More filled with signs and portents for the soul—
More fraught with menace to the universe.

The poet has made a strong and startling arraignment, but if it were ever true, it surely is not in the United States today. The man who toils with his hands in this country is a man with a hope, and more than a hope, for he has an opportunity of earning an honest living, of obtaining at least fair wages, and of making himself useful and happy. The poem is interesting as a piece of literature and probably has served its purpose in other ways, but today it is useful as showing mainly what the United States is not.

Mr. Dickson's address is well worth reading, whether one agrees with his opinions or not. There is no question that today, in many parts of this country, workingmen are giving most serious attention to problems connected with the life of the nation and are often better informed than business men. Some workingmen are drifting into anarchy, socialism and the worst forms of unionism. Go to a meeting of socialists and you will be surprised by the active interest and intelligence displayed by the audience. The great problems of the future will not be solved satisfactorily by ignoring the views of radicals, who should be heard respectfully and answered when their plans are not sound. For this

THE OPEN HEARTH

reason, we publish Mr. Dickson's address and invite discussion of it.

Building of Men

PRESIDENT GRACE, of the Bethlehem Steel Co., at the recent dinner given in honor of Charles M. Schwab, by the Lotus Club, of New York, told the secret of the success of the builder of Bethlehem. He said that the basis of Mr. Schwab's policy was, first, the building of men—men with both ability and enthusiasm—and second, the building of a plant with the most modern equipment. He told how this was accomplished by giving the men a share in the profits and by devoting the remainder to developing the physical plant rather than paying out dividends before the property had been advanced to a satisfactory point. Mr. Schwab was trained by Mr. Carnegie, who appreciated how much more valuable men are than plants or machinery, but Mr. Schwab, to a greater extent than did Mr. Carnegie, gives to his men enthusiasm and confidence, and that, as Mr. Grace said, is greater than money.

Spectres Tall and Short

THE smoke and dirt in American industrial communities commonly are blamed upon the smokestacks of industry. Before the more general use of smoke consumers, industry deserved a large share of the blame. The stacks of Pittsburgh and Youngstown were "tall, dark spectres that clouded the skies with their black breath".

But when industry was shown that smoke could be abated, and economically, it lent reasonably ready encouragement to the efforts of those who made smoke abatement their business. Much has been accomplished; much remains to be done. And at this point it may with emphasis be remarked that by no means does the whole of the remainder of the problem devolve upon industry and its captains.

The *Youngstown Telegram* is performing a public service by publishing interviews and pictures to arouse that city to its need of smoke prevention. It has not fallen into the common error of crusaders in laying all or most of the blame on manufacturing plants. It quotes Henry H. Stambaugh, chairman of the board of directors of the Brier Hill Steel Co. and at the head of other large Youngstown interests, as saying: "Almost within a stone's throw of the Central Square there are four or five stacks which make more smoke in proportion than the mills." On the front page the *Telegram* prints photographs of the downtown section which amply prove Mr. Stambaugh's contention.

Another Youngstown steel man affirms that the residence section in which he lives is reasonably free from smoke dust in summertime, but excessively dirty in winter, when the hotels, office buildings, apartment houses and small residences are burning soft coal and belching heavy clouds from their short stacks. It is necessary, for instance, to change window curtains at lease twice as often in winter as in summer, although the smoke from the mills is not greater in volume in one season more than in another.

"With the co-operation of the manufacturers, the railroads and the men who own large buildings, the remedy can be found," declares Mr. Stambaugh.

Let other than industrial interests proportionately do as much for smoke prevention as the manufacturer has done and is doing, and there will be within a decade a decidedly cleaner and brighter America.

The Resignation of Mr. Hurley

THE resignation of Hon. E. N. Hurley as chairman and member of the federal trade commission is a calamity to the business interests of the country. Without disparaging the character and ability of other members of the commission, it may be fairly stated that Mr. Hurley has enjoyed to a degree almost unprecedented in members of government commissions and boards the confidence of manufacturing and other business interests of the country, and, at the same time, he has not antagonized people who are not engaged in business. This was because he was eminently fair.

When the federal trade commission was organized, its possibilities for good or evil were generally recognized, and Mr. Hurley has rendered service of high character in disarming criticism and in causing the business world to have confidence in the commission. He says that now is the time for the captain to stand on the bridge and he is anxious to get back to his business in Chicago. Naturally, a man would like at this time to be in active charge of his own business, but somebody must "stand on the bridge" of the ship, Regulation of Business, and if that ship is not wisely guided, disaster will follow.

We trust that all rumors of dissension among members of the commission are unfounded, that the wise policy followed under the chairmanship of Mr. Hurley and his predecessor, Mr. Davies, may be continued, and that to fill the places vacated by the resignation of Mr. Hurley and by the failure of the senate to confirm Mr. Rublee, two men worthy of these great positions of trust may be found.

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products January 10, average for December, 1916, average for October, 1916, and average for January, 1916. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Jan. 10, 1917.	Aver. for Dec., 1916.	Aver. for Oct., 1916.	Aver. for Jan., 1916.
Bessemer pig iron, Pittsburgh	$35.95	$35.95	$24.325	$21.32
Basic pig iron, Pittsburgh	30.95	30.95	20.825	19.20
No. 2 Fdy., pig iron, Pittsburgh	31.95	31.70	21.075	19.95
Northern No. 2 Fdy., Chicago	31.00	29.25	19.15	18.50
Lake Superior Charcoal, Chicago	33.75	32.00	20.40	19.25
Malleable, Chicago	31.00	29.25	19.50	19.00
Southern No. 2, Birmingham	23.00	23.00	15.13	14.50
Southern Ohio No. 2, Ironton	30.00	30.00	19.38	18.00
Basic, eastern Pa.	30.50	30.00	21.00	19.50
No. 2X Virginia furnace	26.50	26.00	18.50	17.25
No. 2X foundry, Philadelphia	30.50	29.50	20.50	19.75
Ferro mang., Balti	164.00	160.00	160.00	110.00
Bessemer billets, Pbgh	62.50	58.75	45.75	33.75
Bess. sheet bars, Pbgh	62.50	58.75	45.75	33.75
Op.-h'th sh. bars, Pbgh	62.50	58.75	45.75	34.75
Open-hearth billets, Pbgh	62.50	58.75	45.75	34.75
Steel bars, Pittsburgh contract	3.00	2.925	2.60	1.86
Steel bars, Chgo	3.19	3.10	2.80	2.03
Iron bars, Philadelphia	3.159	3.059	2.659	2.259
Iron bars, Cleveland, local del'y.	3.00	3.00	2.55	2.00
Iron bars, Chgo mill	$3.00	$2.85	$2.35	$1.83
Beams, Chgo. contr	3.29	3.20	2.80	2.03
Beams, Pittsburgh, contr	3.10	3.025	2.70	1.86
Beams, Philadelphia	3.409	3.409	2.859	2.159
Tank plates, Pbgh., contract	3.60	3.525	3.00	1.87
Tank plates, Chicago, contract	3.79	3.75	3.19	2.05
Tank plates, Philadelphia	4.659	4.159	3.909	2.409
Sheets, blk., No. 28, Pbgh	5.00	4.50	3.225	2.58
Sheets, blue anl., No. 10, Pbgh	4.50	4.00	3.125	2.45
Sheets, galv., No. 28, Pbgh	7.00	6.25	4.45	4.75
Wire nails, Pittsburgh	3.00	3.00	2.62	2.12
Connellsville fur. coke, contr	8.00	4.44	3.37	2.38
Connellsville fdy. coke, contr	6.50	6.00	4.87	3.75
Heavy melting steel, Pbgh	24.00	25.00	17.87	17.50
Heavy melting steel, eastern Pa.	22.00	24.00	15.75	16.75
Heavy melting steel, Chgo	21.50	23.37	16.50	15.50
No. 1 wrought eastern Pa	27.00	27.00	22.00	22.25
No. 1 wrought, Chgo	24.50	25.37	17.50	15.50
Rerolling rails, Chgo	27.50	29.50	18.75	17.70
Car wheels, Chgo	20.00	21.87	12.25	14.75

(For Additional Prices See Page 176.)

Strong Foreign Demand for Iron

French Government Enters Market for Large Tonnage of Bessemer— Freight Congestion in the East Interferes With Shipments from Atlantic Ports

New York, Jan. 9.—With domestic business practically negligible, the sustained activity in the foreign demand for pig iron is standing out more prominently. Some of these new foreign negotiations have been of extra importance. The French government has entered the market as a heavy buyer of bessemer iron, through its representatives in this city. Its purchases, it is understood, will aggregate a large figure and there is good ground for the statement that the amount may run considerably over 100,000 tons. Already its recent purchases are placed at 20,000 tons or more, including about 5,000 tons for first quarter from a valley maker, several thousand tons from an Ohio furnace and 10,000 tons from an eastern producer. There are reports of other sales. This buyer and other foreign interests have been paying $35, valley furnace, or $37.14, New York, for standard bessemer. There are offers now current at this figure including 2,000 tons for Italy. Eastern makers of special bessemer have been unwilling to accept $35, furnace, and want $2 to $3 higher. Italy also is in the market for 1,000 tons of southern foundry. Various other foreign inquiries are pending, but Scandinavian buyers who recently have been active in the market have been holding off during the past week or two. Heavy freight congestion and embargoes at leading Atlantic ports are blocking new export sales for prompt delivery. Buying consequently is shifting to more forward periods. Scarcity of shipping room, especially to Italy, also is a strongly obstructive factor. Domestic buyers have been confining their interest to lots for quick shipment at $31 to $32, eastern Pennsylvania furnace for No. 2X. A sale of 1,000 tons of eastern Pennsylvania No. 2X was made to a Connecticut consumer for first half shipment at $32, furnace, the highest forward price yet paid for such iron.

Limited Sales

Philadelphia, Jan. 8.—Only small amounts and a limited number of these have figured in the week's pig iron market in this territory. The period has been so quiet that it has afforded practically no feature of interest. Some improvement has been shown in operating conditions and a half dozen or more eastern furnaces which have been running in a crippled way because of coke shortages, have been able to produce more consistently the past week. The situation, however, still is serious. Many furnaces have fallen behind in deliveries which fact has occasioned a slightly better demand for spot iron, as consumers are urgently demanding metal. Railroad embargoes at eastern Pennsylvania consuming points and at certain line junctions now are complicating the situation. Shipment of Virginia iron by way of Washington has been barred. Small sales of spot eastern Pennsylvania No. 2X have been made at $31 and $32, furnace. Virginia was sold this week at $29, furnace. The inside price on Virginia No. 2X is indefinite. Standard low phosphorus iron has commanded a new high record price of $56, delivered to consumers in the Philadelphia district. The market now is quoted at from $54 to $56, Philadelphia. One eastern maker this week sold about 3,000 tons additional for delivery during the second quarter and last half. One Lebanon producer is quoting $55, furnace, on regular analyses. There is

(*For complete prices see page* 176)

no inquiry for basic. A Philadelphia exporter this week asked for 2,000 tons of special foundry for shipment to Europe.

Basic for Lorain Plant

Cleveland, Jan. 9.—The most important transaction in pig iron was the buying of 37,500 tons of basic by the Cromwell Steel Co., for delivery throughout next year at its plant being built at Lorain. Details of this transaction have been closely guarded. The market is extremely quiet at the present time and, with the exception of the fourth stack of Corrigan, McKinney & Co., which has just been blown in, there is little, if any, tonnage available from furnaces in this district through the first half of this year and a considerable part of the last half. Pig iron production is being increased and some furnaces, which have been banked or working under reduced blast, are not operating satisfactorily and some off iron is being made. An inquiry for 8,000 tons of basic for export to Canada for delivery in the third quarter of the year is pending.

Dull at St. Louis

St. Louis, Jan. 8.—The pig iron market is rather dull in this locality, and local sales agents are not looking for improvement until after stock taking is over. The most interesting inquiry on the market is one for 1,000 tons of southern No. 2. A sale of 300 tons of high silicon iron was made the latter part of last week, but the price was withheld.

Southern No. 2 is strong at $25, Birmingham, for delivery over the first half of the year. Northern iron is held at $31 to $32, Chicago and Ironton.

Chicago Market Still Quiet

Chicago, Jan. 9.—Although some inquiry is being received and some sales being made for first half delivery, the northern pig iron market in Chicago is not active. Practically no inquiry is being made for last half iron, although signs indicate that a buying movement is likely to start at almost any time from now on.

That melters are using more iron than they had expected is indicated by many requests that shipments be anticipated. These requests have been met in some cases and full shipments of January iron have been delivered to some foundries, but continued requests for anticipation are not being acceded to now as readily as in the past.

Foundry, malleable and basic are being quoted at $31, furnace, while higher silicons are bringing $32 at the furnace.

Southern iron is also unusually quiet and almost the only tonnages moving are prompt iron bought some months ago by brokers and now being received on contract. This is disposed of as rapidly as it arrives, and $23, Birmingham, is the ruling quotation. This is considerably lower in proportion than northern iron, which has been the case for some time past. Not much interest is manifested in southern iron for second half, and while $25, Birmingham, is being quoted by some furnace interests, it is believed that attractive tonnages could be placed at $23, Birmingham.

Lake Superior charcoal iron and Jackson county silveries are unchanged at former quotations with makers not anxious to take on further tonnage.

Market Report Index

Weekly Market Review.....123
Pig Iron.....126
Rails, Cars and Track Materials..128
Ferro-Alloys.....128
Semi-Finished Steel.....129
Tin Plate.....130
Plates.....130
Bars.....131
Sheets.....131
Structural Shapes.....132
Coke.....133
Warehouse.....133
Scrap.....134
Wire.....134
Nuts, Bolts and Rivets.....134
Cast Iron Pipe.....135
Merchant Pipe.....135
Non-Ferrous Markets.....138
Iron Ore.....138

Foreigners Want Bessemer Iron

Pittsburgh, Jan. 9.—The pig iron market, except for numerous inquiries for export, is quiet. Representatives of the French government have sent out inquiries for tonnages of various sizes and likely will buy in the neighborhood of 100,000 tons of bessemer iron for early shipment. According to some dealers, not much additional bessemer iron is available for shipment before Jan. 1, next. The domestic market is quiet, but prices are being well maintained all along the line. A nearby blast furnace interest has sold 3,000 tons of basic iron to a local consumer at $30, valley, for delivery in the first quarter. No. 2 foundry and malleable irons are being held at $31 to $33, valley, with some makers refusing to shade $33.

The average price of bessemer iron in December, according to compilations by W. P. Snyder & Co., was $34.213, compared with $29.122 in November. The average price of bessemer iron in 1916 was $22.9317, valley. The average price of basic iron in December was $30, valley, in November, the average price of this grade was $27.229. The average price of basic iron in the year just ended was $20.0329. The average price of bessemer iron in 1916 was the highest recorded in more than a decade. Basic iron in 1907 was established at an average price of $20.93, or about 90 cents above the price recorded in 1916.

Feeling is Better

Cincinnati, Jan. 9.—Feeling in the pig iron market is a little better than it was last week. Embargoes by certain railroads on pig iron and coke to points in Indiana and Ohio have been lifted. Inquiry is better, but it is mostly from melters in surrounding territories. Very little iron is being sold for delivery in this immediate vicinity. Dealers are almost unanimous in stating that melters will not come into the market again until peace talk regarding the war in Europe, comes to more definite conclusions. Prices were unchanged. Southern No. 2 foundry iron is quoted from $23 to $25, Birmingham basis, for any delivery this year. Southern Ohio No. 2 foundry is given at $30, Ironton basis, for the last half of 1917 only. No price is out for the first half. Silvery iron also is quoted only for the last half at $36, furnace, for 8 per cent silicon.

Will Install McLain Furnace

David McLain, Goldsmith building, Milwaukee, has completed negotiations for the installation of an open hearth furnace of 2 to 3 tons capacity in the plant of the Lenoir Car Works, Lenoir City, Tenn. This furnace will be guaranteed to melt five 2-ton or two 2-ton and two 3-ton heats in 12 hours and the temperature of the metal will be such that the smallest castings made in the average crucible steel foundry may be poured successfully. This is the fourth furnace of this type for which David McLain has received contracts in less than a year.

A $200,000 48-flat apartment house will be started soon on Monroe street, Toledo. It will be of concrete and brick construction and will be heavily reinforced with steel. W. J. Peoples is the contractor erecting this building.

(*For complete prices see page* 176)

English Ferro

Is Delivered Slowly—Buyers Turn to Domestic Makers

New York, Jan. 9.—Sales of English ferro-manganese for forward delivery at $164, seaboard, have been figuring more prominently in the market. The total of these recent transactions is placed at from 6,000 to 7,000 tons. These sales are for delivery beginning in April and extending to Jan. 1, 1918, and practically all of them were made by one agent. It develops that the recent purchases of a western Pennsylvania independent steel company previously referred to also have included the requirements of affiliated eastern Pennsylvania works and the amount purchased has been increased to 5,000 tons for delivery. Because of the government restrictions and the fact that they are so far behind in their shipments against current contracts, most English makers continue rather indifferent toward making new sales. Any offerings now are for three to six months' delivery.

The backwardness in current deliveries from England continues to force a number of consumers into the market for early supplies and they are obliged to turn to domestic makers to satisfy these wants. The buyers are finding that it is difficult to place any sizeable amounts for quick delivery. A Pittsburgh steelmaker was unable to obtain 500 tons for January-February and was obliged to consider more extended shipments. A Youngstown district steelmaker asks 500 to 1,000 tons for second quarter, an Ohio river company 350 tons, and there are other smaller amounts in the market. Domestic ferro-manganese is strong at $175, delivered. One middleman has been holding for $210, delivered, for prompt. Early spiegeleisen is scarce as most of the largest buyers have nothing to offer for the first half. Consumers' needs, however, are well covered. There is one domestic inquiry for 1,000 tons for forward shipment. Italy is out for 1,000 tons. Prices are very strong at from $55 to $60, furnace, for 20 per cent.

Indian Manganese Ore

Philadelphia, Jan. 9.—A lot of 5,000 tons of Indian manganese ore for second quarter is being offered by sellers at 72 cents, per unit, at tidewater. Most consumers are more interested in first quarter than for the later deliveries, but they are having trouble to satisfy these wants because of few offerings due to the sold-up condition of the mines in the case of Brazil and to the lack of shipping room from India. A negotiation, involving several thousand tons of Brazilian ore for early shipment, however, is on the verge of being closed at 73 cents, per unit, at tidewater. A large eastern Pennsylvania steel company, which has been inquiring for a heavy block of Brazilian manganese ore, apparently, has been unable to satisfy this demand. Private advices have reached this country to the effect that English makers of ferro-manganese have lost several cargoes of ore en route from India through the vessels having been sunk by German submarines. The indications are that the losses of this kind, about which little has been said, have been considerable.

Quiet at Pittsburgh

Pittsburgh, Jan. 9.—No change of importance is noted in the situation for ferro-alloys in western Pennsylvania. Ferro-manganese is being held at $175 by most dealers. Makers of lower grades of ferro-silicon virtually have withdrawn from the market for delivery before July 1. Prices of lower grades are being maintained on the basis of $42 for 10 per cent at the furnace. Twenty per cent spiegeleisen is quoted at $50 to $60, furnace.

Car Buying

Was Light Last Week—December Makes Good Showing

New York, Jan. 9.—December proved to be another active month in car buying and complete statistics now available show that the awards in that period call for approximately 19,600 cars. This compares with 37,000 in November; 26,000 in October; 15,500 in September and 15,025 in August. Buying of the past week has been light, but a liberal amount of inquiry totaling probably 10,000 is pending. Spanish roads have entered the market for about 2,000 cars. The Spanish-French line wants 1,500 hoppers and the Madrid-Saragossa line, 600 gondolas. The Russian government railways have placed no further orders since the 3,500 four-wheel cars which went to a Nova Scotia builder, but it is reported that a New England shop may receive 4,000. The latter now is in the market for the steel for these cars. Other recent car orders not previously reported include 1,000 hoppers for the Baltimore & Ohio to the Standard Steel Car Co.; 50 hoppers for the Detroit, Toledo & Ironton to the Pressed Steel Car Co. and 100 hoppers for the Atlantic Coast Line to the Standard Steel Car Co. Active domestic inquiries now pending include 1,000 for the Virginian; 1,000 for the Northern Pacific; 500 for the Illinois Central; 200 for the Long Island; 200 for the Nashville, Chattanooga & St. Louis; 200 for the Piedmont Northern and various scattered lots. The Union Tank line is reported in the market for a large number of tank cars.

Some additional rail buying is going on, but the market is not active. The Cambria Steel Co. has sold 10,000 tons of light rails to a construction company in the middle west and these will be rolled from shell steel discards. The recent order of the Southern Pacific for 1918, now is understood, totals about 70,000, all but a small portion of which will be rolled at Ensley.

Rail Buying Light

Chicago, Jan. 9.—Selling of standard steel rails for 1918 delivery continues to be done, but at a much slower rate than prevailed during the latter part of last year. During the past year, the aggregate placed with the western mill has been about 24,000 tons in small lots. Inquiries for heavy tonnages by several important railroads are still pending.

Light rails remain unchanged, with moderate demand and average tonnages being booked.

Car Buying is Light

Chicago, Jan. 9.—Not much business is being closed by car builders and the only orders placed recently are 2,000 all-steel gondolas for the Baltimore & Ohio railroad, which will be fabricated by the Standard Steel Car Co., and 2,000 composite gondola cars by the Pullman Co., together with 1,000 gondolas for the Norfolk & Western railroad, which will be built by the Mt. Vernon Car Co.

Track Work for Export

Cleveland, Jan. 9.—The Lakewood Engineering Co., Lakewood, O., has purchased 10,000 tons of light rails and the light ties made from rerolled material necessary in the construction of track work, for export to France, where it is used in trench service. The tie material is rerolled from crop ends.

Will Soon Resume

The plant of the Hydraulic Press Mfg. Co., Mt. Gilead, O., was visited by fire on the afternoon of New Year's Day. The machine shop and stock room for small stores were badly damaged, but a number of the buildings were not touched by the fire and the power house remains intact. The company is moving its machines into some of these buildings and has nearly completed arrangements to have part of its work done elsewhere, so that it will have its work under way again in a few days.

(*For complete prices see page* 176)

Heavy Shell Steel Demand

Very Large Orders Are Reported and Pending Inquiries Call for Large Tonnages—Semi-Finished Material Scarce

Youngstown, O., Jan. 9.—Makers of semi-finished material are taking little new business, the mills being filled to capacity with orders for first quarter requirements of consumers. Specifications against orders are said to be heavy. Of chief concern to the users of sheet bars and billets is the problem of deliveries, the traffic situation having failed to show any improvement since the first of the year in spite of the expected clean-up during the holiday lull in the mills.

Prices for semi-finished goods range from $60 to $65, although a number of men close to the market claim that if quoted prices could be tested by important sales, the minimum would approximate $62.50.

There are indications that the report emanating from New York to the effect that orders for from 100,000 to 150,000 tons of shell steel have been placed with mills in the valleys, is founded on fact, but this could not be positively verified at the offices of local steel companies. It is rumored that these orders call for delivery in the second half, and that the tonnage was divided between two manufacturers, each contracting for from 10,000 to 20,000 tons per month over the last six months of the year.

It has developed that a local company has sold 1,000 tons of shell discards at $43, which is believed to be a new maximum for this material in this district.

Shell Stock Wanted

Philadelphia, Jan. 8.—An inquiry for 30,000 tons of 6⅜-inch rounds for delivery commencing in February, recently put out by the Baldwin Locomotive Works, remains open. It is understood the shell contract, which this tonnage is to cover, has not been closed. Several makers have bid for the steel tonnage. Offerings by the makers of semi-finished steel in eastern territory are extremely light, as few of the works have any material to spare. Certain eastern Pennsylvania sellers are sold up fully for the present year and have been obliged to decline supplemental business from regular customers. Some makers are short on supplies for their own finishing operations. Export inquiries, which are appearing constantly, receive little attention. Prices nominally are at $60, eastern Pennsylvania mill, for open-hearth rerolling billets, and from $75 to $85, mill, for forging steel. Some sellers name wire rods for export at from $85 to $100, mill. One eastern maker, who has been offering considerable tonnage of shell steel crops has received orders for finished forms to be rolled from these discards and has withdrawn from the market as a seller of this material. Other makers are quoting $45, mill, for crops, and lower is reported.

Semi-Finished Strong

Pittsburgh, Jan. 9.—Manufacturers of semi-finished material, including billets, sheet bars and wire rods, continue to be called upon for tremendous tonnages. Specifications against contracts have not fallen off the last 30 days. Shipments of material are described as somewhat more satisfactory, although the railroad traffic situation is far from normal. Not much new tonnage is being sold in this district. Bessemer and open hearth steel billets and sheet bars are being held at $60 to $65; wire rods have sold at as high as $80 a ton, or $5 a ton above the previously prevailing maximum price. Muck bar nominally is listed at $50, Pittsburgh.

Sheet Bars High

Cleveland, Jan. 9.—Sheet mills are beginning to inquire for sheet bars for the second quarter, but the outlook is that the price will not be less than $60, and that the supply will not be large. One Cleveland mill continues idle on account of inability to buy sheet bars.

Fluorspar Scarce

Philadelphia, Jan. 9.—Gravel fluorspar for prompt shipment continues exceedingly scarce and prices now are quoted at $21.50, per ton, at the mines. This compares with a price of $7, at which many of the steel companies have closed contracts for their 1917 requirements. Lump fluorspar is held at about the same figure as gravel. The mines have their output sold up practically through 1917, especially on gravel.

New Worth Plant

W. P. Worth, Sharpless Worth and associates have placed initial contracts for their new steel works at Claymont, Del., and the completion of the open-hearth building is called for by April. It is hoped to begin the making of steel by the fall. The building contracts placed provide for three open-hearth furnaces of 90 tons capacity each. Eventually, the layout of the works is to embrace 16 open-hearth furnaces. Plans are expected to be issued soon for a plate mill building. One or two mills of this type will be installed. Later, blooming capacity may be added. It is understood, however, that in the new works it is proposed to break down from ingot, which is the same practice that the Worth interests had followed in their former Coatesville plant.

(*For complete prices see page* 176)

False Reports

Concerning Cancellations of British Munition Contracts

New York, Jan. 9.—Recent published reports purporting to come from banking circles, to the effect that there have been large cancellations of British munition contracts in this country in favor of Canadian manufacturers find little confirmation in circles well informed in matters of this kind. Investigation fails to uncover a single instance of a new cancellation of a finished shell contract. Some weeks ago, the British government cancelled large rifle contracts in this country and this action was fully stated at the time. The opinion is held that the allied governments are not likely to cancel any munition contracts now undergoing completion in this country where there is any possibility of their being filled even at a belated date. The policy has been to give the manufacturers every opportunity to fill their orders and cancellation has followed only where it has been demonstrated that the company is unable to turn out a satisfactory product. It also is pointed out that Canadian finishing capacity, which is limited at best, is filled for a long time and it is not likely could accommodate any extensive transfers from this country. It is expected that while renewals of munition contracts in this country may be very few in the future, there is not likely to be any falling off in the demand for raw materials as long as the war lasts. Some new inquiries for shell steel for export are coming into the market regularly. Some came out during the past week.

An additional order for 30 Jacobs-Shupert fire boxes has been placed by the Frisco railroad with the Lukens Iron & Steel Co., Coatesville, for the equipment of that number of locomotives recently ordered. This order duplicates one previously received from the same system.

Highest Price for Plates

For Ships is Made, the Quotation Being $125 Per Ton, Pittsburgh, for Shipment to Japan—Very Heavy Tonnages Going to Mills

Philadelphia, Jan. 8.—Tremendous demand in large tonnages keeps up in plates and higher prices are being obtained in some grades. Japanese ship builders who last week bought 20,000 tons of steel of a leading eastern maker for last half shipment at 6c, Pittsburgh, for the plates and at 4c, Pittsburgh, for the shapes, have taken 4,500 tons additional this week from the same producer for first half delivery at 6.25c, Pittsburgh, for the plates. This is the highest price ship plates have brought to date. Japan remains in the market for large tonnages including 12,000 tons for delivery at the mill's convenience, which has been put out by a Montreal merchant. An inquiry for 18,000 tons of ship plates for export, on which the destination has not been given, has been put before eastern makers by a New York house. Another foreign inquiry for 50,000 tons of ordinary tank plates for construction purposes is before eastern mills. This tonnage is not for ship yard purposes.

The Laconia Car Co., Boston, has taken quotations on 17,000 tons of universal plates for a Russian car order upon which it is figuring. Other car shops are in the market. For Brooklyn electric railroad construction, 6,100 tons are wanted.

The plate tonnage going to the mills representing specifications against contracts and new business is very heavy. The Philadelphia office alone of one important eastern Pennsylvania works has been sending in mill orders recently representing twice the output of the plant for that period. Universal plates, which had been lagging, now are much stronger. One maker who recently could ship promptly now is naming five to six months and has advanced his price $15 a ton or from 4c to 4.75c, Pittsburgh, for universals. Ordinary tank plates among eastern mills are at from 4.75c to 5c, Pittsburgh. On an export sale of 1,000 tons of structural plates to the far east, 5c, Pittsburgh, was obtained.

Car Shortage Handicaps Mills

Pittsburgh, Jan. 9.—Manufacturers of finished steel products in the Pittsburgh district, as elsewhere, continue to be seriously handicapped by the shortage of railroad cars and insufficient motive power. During the holidays, some mills in this territory had fully 50,000 tons of finished stock awaiting the arrival of cars or motive power. While stocks have been reduced considerably this week, yet the traffic situation has not improved appreciably. The Pressed Steel Car Co., with works at McKees Rocks, Pa., is building 105 steel gondola cars of 55 tons capacity each, to haul material from the mills in this district to its shops.

Demand for steel plates is as heavy as ever. Notwithstanding the holidays, mill managers say specifications last week were as heavy as those received in the corresponding period of December. The Carnegie Steel Co. is asking 3.60c for delivery at its convenience, but some mills are obtaining as high as 4c and 4.50c for early shipment. The Pressed Steel Car Co. has received orders for 1,600 cars for the San Pedro, Los Angeles & Salt Lake railroad.

Stronger Than Ever

Cleveland, Jan. 9.—The plate market is stronger than ever. One eastern mill, which has been quoting 4c, mill, on universal plates for delivery in one to two months, has marked up its quotation to 4.75c, an advance of $15 per ton and is not now giving deliveries in less than three to four months. The same company continues to quote 5c on sheared plates for delivery in 6 to 10 months.

Demand Strong

Chicago, Jan. 9.—Although no plate mill capacity is available in this market, buyers of this material are seeking large tonnage and as soon as large independents come to the point of making further contracts, it is believed the full remaining tonnage available for 1917 will be covered in a few hours. Although the nominal quotation is 3.79c, Chicago mill, it is practically certain that 4.69c to 5.19c can be obtained readily if mills will accept premium business and are able to satisfy necessities of regular customers at the same time. This indicates the strength of demand for this material on the part of ship, car and tank builders.

The Metal Specialties Co., 720 West Monroe street, Chicago, has increased its capital from $100,000 to $150,000.

Plans have been prepared by Steffens & Steffens, architects, for a hotel to be erected at East Twenty-second and Prospect streets. The building will be 100 x 200 feet and will first be made three stories. Stores and offices will occupy this part. The main body of the hotel, nine stories, will be added at a later date. The structure will be of brick and terra cotta. Alexander Bros. are contractors.

(*For complete prices see page* 176)

Tin Plate Books

May Not be Opened for 30 Days for Last Half Delivery

Pittsburgh, Jan. 9.—Tin plate manufacturers have not sold any material for shipment after July 1, and it may be 30 days before books are opened for second half delivery. Scarcely any material is available for shipment before July 1. The American Sheet & Tin Plate Co. has made no formal change in quotations since the adoption of the $7 price for first half shipment; that figure is regarded as nominal, since no tonnage is being sold by the American company in the open market. Some mills are asking as high as $8, base.

New England Foundrymen Elect

T. R. Scott, of the Brown & Sharpe Mfg. Co., Providence, has been elected president of the New England Foundrymen's Association for the ensuing year. The other officers named are: Geo. P. Aborn, Blake & Knowles Steam Pump Works, East Cambridge, Mass., vice president; Geo. H. Gibby, Gibby Foundry Co., East Boston, treasurer, and Fred F. Stockwell, Barbour-Stockwell Co., Cambridge, secretary. The executive committee is made up of Chas. A. Reed, Reed, Fears & Miller, Boston; H. Paul Buckingham, Arcade Malleable Iron Co., Worcester; A. N. Abbe, American Hardware Corporation, New Britain, Conn.; A. B. Root, Hunt-Spiller Mfg. Corporation, Boston, and Robert E. Newcomb, Dean Steam Pump Works, Holyoke. The election of these officers took place at the twenty-first anniversary meeting of the association held at the Exchange Club, Boston, Wednesday evening, Jan. 10. Following the meeting, dinner was served and an interesting program of addresses and entertainment was rendered. Chas. L. Newcomb, of Holyoke, acted as toastmaster.

The Westinghouse Lamp Co., Bloomfield, N. J., has granted a bonus of 8½ per cent on weekly salaries. The bonus will be paid in addition to the month's pay in the yearly salary of every employe.

Sheet Demand Very Heavy

Important Buyers Trying to Contract for Last Half of This Year—Traffic Conditions Embarrass Business

Pittsburgh, Jan. 9.—Manufacturers of farm machinery, automobiles and electrical equipment are endeavoring to cover steel sheet requirements for the third and fourth quarters of this year. They are asking mill managers to reserve tonnages for second half shipment and they do not appear to be concerned much about the price at which material will be delivered. So far as can be ascertained, none of the mills in this district has opened books for delivery after July 1.

Only limited quantities of steel sheets have ben sold recently in western Pennsylvania. Blue annealed sheets are selling at 4c to 4.75c, although a number of mills are refusing to shade 4.50c, base. Black sheets are commanding from 4.50c to 5.50c and tin mill black sheets are equally as high in price as sheet mill products. Galvanized material is scarce, even scarcer than it was a week ago, when only about 33 per cent of the galvanizing capacity of sheet mills in this territory was employed. At the close of last week, it was estimated that not more than 26 per cent of the galvanizing pots in sheet mills were in operation. Not enough coated stock has been sold recently to give one an accurate line on the price situation. No. 28 gage black sheets are listed at 6.50c to 7.50c.

New Business Limited

Philadelphia, Jan. 8.—Blue annealed sheets have been sold by eastern Pennsylvania makers at 5c, Pittsburgh, or 5.159c, Philadelphia, for No. 10. Contracts for shipments this side of July have been closed on that basis. Eastern mill quotations range from 4.50c to 5c, for No. 10 gage blue annealed. New business is limited since producers have sold themselves practically full to July, which is a much larger accumulation of business that usually is held by eastern mills. There is some new foreign inquiry for sheets, which is less attractive to the producers because of the heavy domestic requirements.

Deliveries Delayed

Youngstown, O., Jan. 9.—A deplorable traffic situation, which is said to have curtailed shipments of finished materials to about 60 per cent of the normal, is seriously affecting the delivery of sheets and tin plate. Black sheets, No. 28, are quoted at 4.50c to 5.50c, one mill asking 5c. Quotations of blue annealed No. 28 and galvanized No. 28 remain at from 4c to 4.75c and 6.50c to 7.50c, respectively. Present indications promise no relief in the car situation.

An Export Sale

Cleveland, Jan. 9.—The sheet market in Cleveland continues very strong and the usual quotation of Cleveland mills on No. 10 gage is 5c. A sale of 100 tons for export was made at 5.50c. It is understood, however, that a northern Ohio mill has quoted 4.25c on No. 10.

Steel Bars Strong

But Mills Are Not Disposed to Do More Contracting

Chicago, Jan. 9.—The market for soft steel bars is purely nominal, with no important interest booking new business. The quotation is 3.19c, Chicago. The leading interest is practically sold through the present year and is taking nothing but a few small tonnages.

The first week of the new year brought a heavy flood of specifications, larger than almost any recent week, indicating that consumers feel certain of their need for material for many months. Specifications made now will apply on material to be delivered several months hence.

Hard steel bars are firm at 3c to 3.25c, Chicago mill, with steady demand and fair business being booked. Inability to obtain sufficient supply of rerolling rails has limited contracting for this material, as mills are backward about selling more bars than the supply of raw material will make. Some difficulty has been experienced in keeping rolling schedules balanced, as specifications for light sections have been greater than for heavy sections and some premium on the former has been obtained.

Production Curtailed

Philadelphia, Jan. 8.—Production of some independent makers of steel bars has been cut because of raw steel shortages. For that reason, these producers are reluctant to make new sales of either semi-finished steel or of bars. There is little effort to sell on the part of the mills generally and the market is quiet. Some of the larger consumers in this district already have specified the greater part of their contract tonnage for the first half. Jobbers have specified liberally their first quarter tonnages, and some of them have been seeking additional material. Prices are unchanged at 3c to 3.25c, Pittsburgh, or 3.159c to 3.409c, Philadelphia.

Active at Pittsburgh

Pittsburgh, Jan. 9.—Pressure for steel bars is as insistent as ever. Manufacturers say consumers appear to be as anxious about the delivery of bar stock as they were several months ago. Steel bars are being held at 3c by the Carnegie Steel Co. and the Jones & Laughlin Steel Co. for delivery at their convenience. Bar iron is being held at 3.25c, although as high as 3.50c is being paid for comparatively small tonnages. On the other hand, reports of 3.25c being shaded are heard in isolated instances.

Bar Iron Quiet

Chicago, Jan. 9.—The situation in bar iron in the Chicago market is practically unchanged from that existing late in December. Most makers have sold the greater portion of their output through first half, taking contracts for an unusually long period, and are not in a position to assume much more tonnage.

The nominal quotation is 3c, Chicago, and some sellers who are willing to take more business have sold as high as 3.10c, Chicago.

Considerable inquiry is being made by car builders and automobile manufacturers for iron bars to use in the place of soft steel, which is difficult to obtain.

Shafting May Advance

Pittsburgh, Jan. 9.—Some mills are in a position to ship shafting within 60 days. Material is being held at 10 to 20 per cent off the list, although the latter figure gradually is disappearing. It is likely that the market will be established at 15 per cent off the list as a minimum this month.

Hoops and Bands

Pittsburgh, Jan. 9.—Heavy demand exists for hoops and bands. Some mills are selling material for nearby delivery at several dollars a ton above prices for shipment at the convenience of the mill. The Carnegie Steel Co. is quoting hoops at 3.50c and bands at 3c for delivery at its convenience. Hoops and bands have commanded as high as 4.25c and 4c, respectively, for several quarter shipments.

The National Tube Co., Pittsburgh, has purchased 3½ acres of land in McKeesport, Pa., from the Pittsburgh Coal Co.

(For complete prices see page 176)

Shapes for the Government

Large Tonnages Are Needed for Navy Yard Extensions—Sale of 10,000 Tons to Cover Russian Car Requirements

Philadelphia, Jan. 8.—Large tonnages of structural material have been asked by the government for navy yard extensions and by the city of Philadelphia for portions of its new subway system. For enlargements of the League Island navy yard, this city, the government asks 8,400 tons and a further quantity is wanted for improvements at Norfolk and Indian Head, Md. The three Philadelphia subway sections put out call for about 8,000 tons. Export work also is furnishing some important demands. An eastern Pennsylvania maker will supply about 10,000 tons of shapes to the Eastern Car Co. of Nova Scotia, covering a recent 3,500 Russian car order. The Laconia Car Co. is inquiring for 3,000 to 5,000 tons of shapes for a tentative order of the same kind. The Cambria Steel Co. has received 2,500 tons of bridge work for the far east.

Some eastern shape mills now are practically sold up for the calendar year 1917 on the basis of present shipments. Accordingly they want little additional business, and they are quoting high to avoid new tonnage. Buyers, however, continue to press makers for material, and one eastern maker has obtained first quarter contracts at 3.75c, Pittsburgh. A 3.50c, Pittsburgh price on shapes is general in the east, but on a round tonnage for extended shipment, 3.25c probably could be done. One maker is quoting 4c, Pittsburgh, on export orders and has sold both ship and bridge shapes at that price.

Demand Heavy

Pittsburgh, Jan. 9.—Fabricators say inquiries for material involve heavy tonnages in the aggregate. Specifications have not fallen off and mills rolling structural shapes and plates are entertaining many new inquiries. The McClintic-Marshall Co. has received orders for 3,000 tons for mill buildings for the Whitaker-Glessner Co., at Portsmouth, O. The H. Koppers Co. has placed contracts with the McClintic-Marshall Co. for about 5,000 tons and the American Bridge Co. will furnish 4,500 tons of fabricated steel for shipment to one of the eastern ship yards.

Structural Sales Light

Chicago, Jan. 9.—Sales of structural shapes in the west during the past 10 days have not been large and have been confined to railroad and industrial needs. The quotation on structural material is nominal at 3.29, Chicago mill.

CONTRACTS AWARDED.

Milwaukee Western Fuel Co., ten ton ore bridge at Milwaukee, Wis., 400 tons.

Gilliam Mfg. Co., foundry building at Canton, O., 335 tons. Los Angeles & Salt Lake Railroad, two 75-foot and two 50-foot through plate girder skew spans at Las Vegas, Nev., (Harriman work), 236 tons, to American Bridge Co.

The American Bridge Co. has received an order for about 4,500 tons of fabricated material for shipment to an eastern ship yard.

The H. Koppers Co., 5,000 tons, to the McClintic-Marshall Co.

The Whitaker-Glessner Co., Wheeling, W. Va., 3,000 tons, to the McClintic-Marshall Co., for mill buildings at Portsmouth, O.

The Central Railroad of New England, 2,250 tons, to the Fort Pitt Bridge Works, for repairs to the Poughkeepsie bridge.

The Inland Steel Co., Chicago, 600 tons, to the McClintic-Marshall Co. for trestle extensions.

Filtration Plant Contracts

The bids on the construction and equipment of the new filtration plant at Lima, O., were awarded recently. Contract No. 1, the general contract for construction, was awarded to the A. Bentley & Sons Co., of Toledo, at $170,000. This contract includes the erection of the filter plant and pumping station. Contract No. 2, item 1, a 6,000,000-gallon pump, and item 4, a 500-kilowatt generator, was secured by the Dravo-Doyle Co., of Pittsburgh, for $21,000. Item 2, three 4,000,000-gallon pumps, and item 3, two 25,000,000-gallon pumps, went to the John H. Danforth Co., of Buffalo, N. Y. Item 5, two 225-horsepower boilers, was given to the Babcock & Wilcox Co., of New York City, for $10,400. Item 6, a concrete stack, 6 x 150 feet, was awarded the Webber Chimney Co., of Chicago, for $3,800. John H. Jones, of Fostoria, O., was awarded contract No. 3, which is an 800,000,000-gallon reservoir, at $257,000.

Brier Hill Improvements

Youngstown, Jan. 9.—The Brier Hill Steel Co. is adding four jobbing mills to the Western Reserve plant recently acquired at Warren, this being the first step in making big extensions that are planned. Also a new 1,000-kilowatt motor has been ordered from the General Electric Co. to drive the plant with electricity instead of steam power.

A number of new annealing furnaces are also being added to the equipment. Besides this, the same corporation is completing two additional open hearth furnaces, an 84-oven by-product coke works at the plant in Youngstown. Other large extensions will greatly increase the facilities for production.

(*For complete prices see page* 176)

Electric Furnaces

Will be Made in Cleveland—Company Will Move From Alliance

The Cleveland Industrial Development Co. has completed the sale of $100,000 preferred and $50,000 common stock of the Electric Furnace Co. of America, now located at Alliance, O. The date for closing subscriptions was Jan. 10, 1917, and the issue was considerably oversubscribed.

Cleveland investors are to be represented on the board of the Furnace company by four of the seven members, and the business is to be removed to Cleveland with as little delay as possible.

The Furnace company, after a number of years of experimental work, has produced and standardized several types of electric furnaces that are commercially successful. They are known as the Baily electric furnaces, and are used in the heat treating of steel and in the melting, heating and annealing of non-ferrous metals. Contracts in hand and in prospect would indicate a very busy year for the company in 1917.

New Foreign Plant

New York, Jan. 8.—Frank L. Driver, of the Driver-Harris Wire Co., Harrison, N. J., sailed for England Jan. 6 on the steamer St. Louis. He will go to Manchester, where he will participate in the opening of the new plant of the Driver-Drennan-Cooper Co. The latter concern was organized in Manchester a short time ago for the manufacture of the products made at Harrison, N. J., by the Driver-Harris Co. Heretofore, this concern has shipped finished products to England, but serious delay in filling British orders has been encountered due to the war conditions. Raw materials for the Manchester plant will be obtained in this country.

The Wilkoff Bros. Co., Youngstown, has engaged offices formerly occupied by the Standard Chain Co. in the First National Bank building, Pittsburgh.

Coke Still High

But Railroad Service Has Improved—The Year's Production

Pittsburgh, Jan. 9.—The market for Connellsville coke has been adjusting itself rapidly since Jan. 1. Blast furnace fuel for immediate delivery, quoted at as high as $12 a ton during the holidays, has been selling at $9 a ton at the ovens this week, and 72-hour coke for spot shipment, has been obtained at $10 a ton at the ovens. Shipments are described as much more satisfactory, although traffic conditions may become seriously complicated at any time. The mild weather the last fortnight has enabled shippers to move fuel under favorable conditions.

The market for contract furnace and foundry coke reflects decided strength. Fully 15,000 tons of furnace coke have been sold this year at $8 a ton for delivery in January, February and March; some coke for January and February shipment has commanded $8.25, ovens. A northern Ohio foundry interest is reported to have paid $8 a ton for a rather heavy tonnage of cupola fuel. Most cokemakers are offering 72-hour coke at $6.75 for delivery the first half of the year.

In the annual review of the coke market, appearing on page 26, of the Jan. 4 issue of *The Iron Trade Review*, the production of Connellsville coke for the year 1916 was estimated at about 22,000,000 tons; that estimate was based upon production in the first 11 months of the year. *The Connellsville Courier*, under date of Jan. 4, gives the production in 1916 as 21,761,605 tons, an increase of 1,556,600 tons over production in 1913, the previous banner year. Production the week ending Dec. 30 was 331,911 tons, compared with 333,948 tons the week before.

Moving Slowly

St. Louis, Jan. 8.—Coke is moving slowly, with prices ranging from $11 to $12 a ton for Connellsville 72-hour foundry grades. By-product coke is in heavy demand at $12.80 for foundry grades, and with the exception of a slight car shortage, shipments are being cared for.

Advances at Cincinnati

Cincinnati, Jan. 8.—Wise County operators today advance prices on foundry coke from $1 to $2 a ton, for contract delivery. The reasons given are curtailment of production made necessary because of shortage of labor and railroad equipment, and the fact that many operators are selling coal direct rather than turn it into coke. Quotations for spot delivery are nominal and range all the way from $8 to $15 a ton, depending upon special conditions of each sale. No quotations are out for furnace coke. Wise County foundry coke today is quoted from $6 to $7.50, ovens. Pocahontas foundry grades are quoted the same as those from Wise County. New River operators are holding foundry makes from $6.25 to $8, ovens, for contract shipment.

Sale at $13

Cleveland, Jan. 9.—A sale of several cars of Rainey foundry coke was made last week at $13, ovens. Other grades were sold at $11, all for prompt delivery. No sales are reported this week. Deliveries are improving slowly.

Spot Prices High

New York, Jan. 9.—Spot coke in the east continues to command high prices as a number of consumers are in pressing need. One seller in the week disposed of 65 cars of spot Connellsville furnace coke at $9.50, at the ovens. A Schuylkill valley furnace paid $10.50, delivered, for spot fuel, and there was a recent sale of 1,000 tons of 48-hour coke to an eastern Pennsylvania foundry interest at $10, ovens. Connellsville foundry coke for spot shipment was sold in this territory in the week at $12, ovens.

Tungsten Advances

New York, Jan. 9.—The market on tungsten ore during the past week or two has been characterized by a tendency toward higher prices. The large producers are making efforts to bring quotations to the $20 level or higher, and in some cases $22 to $24 per unit is named as the asking level. That enough material to supply the current demand, however, is obtainable at considerably lower prices, is proved by the figures obtained in the most recent transactions. These sales indicate that the market on 20 to 100-ton lots still may be quoted at $16 to $18 per unit of tungsten trioxide, for 60 per cent or better ore, free from sulphur, arsenic, tin, phosphorus or other objectionable impurities.

Big Dividends

The Standard Screw Products Co., Detroit, a Michigan corporation, has just declared a 50 per cent stock dividend to all stockholders of record on Jan. 1, in addition to the regular monthly 1 per cent cash dividend. This company recently paid an extra cash dividend of 50 per cent. The capital has been increased from $100,000 to $250,000.

(*For complete prices see page* 176)

Warehouse Prices

Are Still Advancing—Difficulty in Replenishing Stocks

Cincinnati, Jan. 8.—Warehouse prices are firm, following advances of last week. Steel bars are quoted from 3.80c to 4.35c, shapes and plates from 3.90c to 4.60c, and No. 10 blue annealed sheets at 4.60c, all f. o. b. Cincinnati. Building operations are active and are creating heavy demand for light structurals and reinforcing bars. Stocks in local warehouses are light and much trouble is being experienced securing shipments from mills. Dealers can see nothing but a strong market in the near future.

Black Sheets Higher

Cleveland, Jan. 9.—No. 28 black sheets are now quoted 5.50c at Cleveland warehouses, an advance from 5c. Warehouse business is very active, but continues to be curtailed by inability of the sellers to replenish their stocks.

Chicago Stores Advance

Chicago, Jan. 9.—Chicago warehouses advanced finished steel $3 per ton Jan. 2, following a similar advance in mill prices. No. 10 gage blue annealed and No. 28 gage black sheets were also advanced, the former to 4.65c, Chicago store, and the latter to 5.15c, Chicago store.

Carnegie Banquet

Operating and sales officials of the Carnegie Steel Co. held their twentieth annual banquet, in the William Penn hotel, Pittsburgh, Jan. 6. Several interesting papers relating to various kinds of service were presented. Among the honor guests were: James A. Farrell, president of the United States Steel Corporation, and Alva C. Dinkey, former president of the Carnegie company. Homer D. Williams, president of the company, was toastmaster. John McLeod, assistant to the president, responded to the toast, "Sociology of Service". Ambrose N. Diehl, assistant general superintendent at the Duquesne Steel Works, spoke on "Service of Production". "Service in Commercialism" was discussed by John W. Dix, assistant general manager of sales. Col. H. P. Bope, vice president and general manager of sales, responded to the toast "Service; Its Aim and End". About 100 members of the Carnegie company attended the dinner.

The plant of the American Malleables Co. of Owosso was damaged by fire to the extent of $4,000. This is covered by insurance.

Scrap Steel Weak

Prices Lower in Some Districts and Demand is Limited

Pittsburgh, Jan. 9.—The market for iron and steel scrap in the Pittsburgh district, which registered rather sharp declines at about the time Germany made overtures for peace, has not yet showed any signs of recuperation. Most grades of old material are being quoted at from $3 to $5 a ton less than prices prevailing a month ago, although not much tonnage is being sold at current prices. Mills in this and adjacent territory appear to have enough stock on hand to meet requirements for 30 days or longer. Dealers believe that prices will advance sharply just as soon as active buying is resumed.

Heavy melting steel is hovering around $24. Rerolling rails, which had commanded as high as $36 a ton, now are listed at $31. Machine shop turnings and borings are selling at about $12 a ton and other grades are proportionately lower in price. Sellers and buyers of scrap have been handicapped by the slow movement of freight. While the traffic situation is described as somewhat more satisfactory, yet deliveries are deferred in most instances.

Heavy Melting Declines

Philadelphia, Jan. 8.—A further wearing away of old material prices in this territory has continued, as new buying has been light. Heavy melting steel is 50 cents to $1 lower. A Schuylkill valley steelmaker bought 1,000 tons at $22.50, delivered, and subsequently purchased on an offer another 1,000 tons at $22 delivered. Other grades are easier, including railroad wrought, forge, borings, turnings and bundled sheets. Stove plate was sold this week at $16.50, delivered. Rerolling rails hold their strength because of scarcity and sales this week at $30, delivered, are noted. Freight embargoes are more numerous and are a leading factor in present conditions, because new shipments cannot be made to various points, including Harrisburg, Columbia, Lebanon and others. The embargo against the Lukens Iron & Steel Co., Coatesville remains in effect.

Cleveland Scrap Quiet

Cleveland, Jan. 10.—The holidays, peace talk and inventory season have proved to be a combination of irresistible factors so far as activity in the Cleveland iron and steel scrap market is concerned. Consumers are buying little material and trading among brokers and dealers is comparatively light. Prices, however, are holding firm at the levels which have existed for the past two weeks. Users of heavy melting steel bought heavily just before Germany issued her famous peace note, paying top notch prices, since which time the market has dropped $5 to $6 a gross ton. However, consumers are well covered for the next few months, while dealers have much profitable business to handle this half year. Heavy melting steel continues quoted $22 to $22.50.

Scrap Iron Quiet

Cincinnati, Jan. 8.—The iron and steel scrap market is at a standstill, following a slight decline early last week. Prices today are nominal because transactions are too light to test them. Demand from surrounding territories is low, and consumption in this district is not sufficient to take care of supply. A small amount of heavy melting steel was sold late last week to a Youngstown, O., melter, at $19 per gross ton, Cincinnati.

Lower at Chicago

Chicago, Jan. 9.—Further recessions in quotations on iron and steel scrap are being made and almost all grades are losing 50 cents to $1 per ton from week to week. Consumers are remaining out of the market and while there is considerable movement of material, new sales are scarce. It is thought that constant buying during November and the early part of December forced prices to a level above where they should have gone and that the present recession is simply an adjustment to meet conditions. The fact that consumers are not buying possibly will carry prices somewhat lower than they naturally would reach. The general impression is that a return to former levels will not be made. Most large dealers are selling short on the belief that still lower levels will be reached. Heavy melting steel and other heavy products are now quoted at $21.50 to $22 and rerolling rails at $27.50 to $28.

Railroads continue to offer only small tonnages, as labor to gather and cars to ship accumulations are difficult to obtain. The Wabash Railroad offers 1,340 tons, the Union Pacific 855 tons and the Kansas City Southern 140 tons.

Prices Remain Firm

St. Louis, Jan. 9.—The scrap market remains quiet, principally because very little material is offered, and for the further fact that consumers have discontinued buying until after inventories have been completed. There has been some cutting of prices under market values by dealers who had cars to move and were compelled to unload. However, as a whole, prices have remained firm and any large tonnage offered commands top prices.

There have been a few inquiries for large tonnages of cast iron wheels, and it is confidently predicted that this grade will bring over $25 a ton before the close of the month. Relaying rails also are greatly in demand, but the supply is exceedingly limited, so that the tonnages available are bringing fancy prices.

The only railroad offerings before the market this week are: Wabash, 1,800 tons; Mobile & Ohio, 460 tons; Vandalia, 200 tons; Kansas City Southern, 150 tons; Louisiana & Arkansas, 100 tons.

(*For complete prices see page* 176)

Wire Prices

Are Not Changed, But Premiums Paid For Prompt Delivery

Pittsburgh, Jan. 9.—Prices of wire products have not been changed since Nov. 24, 1916, when a general advance of $3 a ton was announced by the American Steel & Wire Co. Since that date, material has been sold on the basis of $3 a keg as the base price of nails. Owing to the fact that mills are sold up for several months, some people do not believe prices will be changed until consumers enter the market for second and third quarter requirements. Specifications against contracts are heavy, and shipments are described as slightly better than previously. For early delivery, some mills are quoting $5 a ton above generally prevailing prices.

Nuts, Bolts and Rivets

Pittsburgh, Jan. 9.—Manufacturers of nuts, bolts and rivets say no difficulty was experienced in establishing advanced prices, adopted the latter part of 1916. Ship and car builders are prominent factors in the market and many of them are offering premium prices for nearby shipment. It is likely that nuts, bolts and rivets will be advanced in price further at an early date.

Cold Rolled Strip Steel

Pittsburgh, Jan. 9.—No change is noted in the situation for cold rolled strip steel, manufacturers continuing to ask 7c, base, for delivery at their convenience. Mills cannot promise additional tonnages for delivery before July 1. Contracts for shipment after that date are not being accepted.

Cast Iron Pipe

Prices Made at Cleveland Reflect Advance of Nine Months

Cleveland, Jan. 9.—The United States Cast Iron Pipe & Foundry Co. was awarded 5,885 tons of pipe by the city of Cleveland, the sizes ranging from 3-inch to 38-inch, the principal tonnages being 2,000 of 16-inch and 1,300 of 6-inch. The price for the 3-inch pipe was $54.25, for the 4-inch $47.25, and for the 6-inch and larger $44.25, compared with $42.85, $34.85 and $31.85, respectively, paid by the city when its last preceding contract was made in March, 1916. Contracts were also awarded for 265 tons of special castings.

Slow at Chicago

Chicago, Jan. 9.—Practically no important tonnages of cast iron pipe are being considered in this market. Cities are backward about buying much pipe for this year's work at present prices, and while some of the larger municipalities have taken bids and placed their business, there is almost an absence of this class of business at present.

The National Cast Iron Pipe Co. has been awarded 1,500 tons at St. Paul and the United States Cast Iron Pipe & Foundry Co. on 6,000 tons at Cleveland.

Heavy business in special castings is making up for lack of straight pipe work as industrial concerns are using much of this material in their various extensions.

Little Eastern Buying

New York, Jan. 9.—A quarter market in cast iron pipe continues in eastern territory. Some buyers are unwilling to close for forward shipment at the advanced level of current prices and they are making purchases for delivery as they need the material. So far the works have not been so filled up that they cannot supply these demands promptly. Public lettings still are few and private buying also is more limited. Boston took bids today on a readvertised letting of 2,465 tons of 4-inch to 10-inch. A number of export inquiries continue to appear, the largest of which is a Chilean matter previously referred to. This involves 3,760 tons of 8-inch. There also is an inquiry for 1,000 tons of small pipe for Pernambuco, Brazil. Prices on pipe are well maintained in the east.

The Superior Steel Co. has been incorporated in Virginia to take over the Superior Steel Co., Carnegie, Pa., under the terms of the acquirement of the latter company by New York and Philadelphia bankers. The capitalization of the new company is to be $16,500,000 divided into $11,000,000 of common, $3,500,000 of 8 per cent first preferred and $2,000,000 of 8 per cent convertible second preferred.

In Boston

American Foundrymen's Association Will Hold Convention

The annual convention of the American Foundrymen's Association will be held at Boston during the week of Sept. 24. Concurrent with this meeting will be conducted an exhibition of foundry equipment and supplies, machine tools and accessories in the Mechanics building, which affords an exhibition floor area of approximately 80,000 square feet.

This is the second time in the history of the American Foundrymen's Association that it has selected New England for its meeting place, the previous convention having been held at Boston in 1902. At that time, the membership of the American Foundrymen's Association was only a few hundred, whereas at present the enrollment is considerably over 1,000. In addition to the meeting of the American Foundrymen's Association, the American Institute of Metals will hold its annual convention at the same time and place.

New Nail Mill

The American Steel & Wire Co. is about to erect a new mill at its central works at Worcester, Mass., which it is stated will be the largest addition made to the plant since it was acquired by the former American Steel & Wire Co., in 1899. The mill will occupy a building 70 x 334 feet, of brick construction, and one story high.

Wm. A. Field Resigns

Chicago, Jan. 10. (By wire.)—William A. Field, for 13 years general superintendent of the Illinois Steel Co.'s plant at South Chicago, has resigned to become general manager of the United Alloy Steel Corporation, Canton, O., Peter A. Newton, for 10 years Field's assistant, succeeds him.

The Prairie State Incubator Co., Homer City, Pa., is figuring on installing a small foundry floor in connection with its plant for the production of castings for its own consumption. The company requests catalogs from makers of foundry equipment.

(For complete prices see page 176)

Pipe in Demand

And an Even More Active Market is Expected

Youngstown, O., Jan. 9.—The quotations of Pennsylvania crude oil at $3.05, thus realizing the producers' dreams of three-dollar oil, is taken by manufacturers of pipe in the valley district as a positive indication that owners of oil properties in western Pennsylvania, eastern Ohio and West Virginia will resume operations that were suspended when reduced production and low prices removed the profit from their business. That renewed activities in these fields will result in a considerable demand for pipe line goods is confidently expected. It is understood that a man closely connected with the oil business was in the Youngstown district today, presumably for the purpose of sounding manufacturers on the possibility of securing pipe for tentatively planned extensions.

Makers of pipe are well supplied with orders. One company is in a position to make deliveries in four months from the date of order, and it is believed that in general, time of deliveries varies from two to nine months, depending on the size of pipe required. The condition of the order books of manufacturers in this district is indicated by the difficulty experienced by promoters of a pipe line project in the west who are trying to place an order for 100 miles of 8-inch pipe. So far as can be learned this inquiry has gone begging, no manufacturers being willing to tie up his plant with this order.

Pipe Advance Established

Pittsburgh, Jan. 9.—Makers of wrought steel and iron pipe, who advanced quotations $4 a ton on Dec. 30, have experienced no trouble in establishing the market on the higher levels. Demand for tubular goods is described as heavy. Numerous inquiries for large tonnages of line pipe are pending; an inquiry for 40,000 tons of 6-inch line pipe for Canadian shipment and another inquiry for about 16,000 tons of 8-inch line pipe for delivery to central western points are pending in this district. Boiler tubes are being quoted at from $2 to $6 a ton above prevailing prices by some makers. Deliveries of seamless tubing are deferred 12 months in some instances.

The Union Steel Casting Co., Roxbury, Mass., has added a 100 x 320-foot fireproof building to its foundry. Two new 10-ton open-hearth furnaces will be installed in this extension.

Big Bond

Furnished by Ford, Who Can Now Build His Rouge Plant

Detroit, Jan. 8.—Work on the blast furnaces and steel plant started by the Ford Motor Co., on the River Rouge may now be completed, Henry Ford having furnished a bond for $10,000,000 indemnifying Dodge Brothers, who brought the suit in circuit court, against loss to the Dodges as stockholders in the Ford Motor Co. The suit brought by the Dodge brothers demanded the distribution of $58,000,000 surplus and to prevent the erection of the River Rouge plant.

Circuit Judges Wiest, Chester and Hart ruled that Ford may continue with his new plant after Henry Ford, Frank L. Klingensmith and Horace Rackham, co-defendants in the Dodge suit, have signed the $10,000,000 bond. The bond was formally accepted by Judges Wiest and Chester, the approval of two judges being sufficient. Following this it was announced that the suit proper would be brought to trial April 9. Action in the matter so far has been of a preliminary nature and a long legal battle will probably result before the matter is ultimately settled.

Plate Mill Returns

Mitchell-Tappen Co., 50 Broad street, New York City, has sold to the Jones & Laughlin Steel Co., Pittsburgh, for account of its Canadian principal, the Dominion Iron & Steel Co., Ltd., of Sydney, C. B. Nova Scotia, the 128 x 34-inch three-high plate mill, together with the 132-inch plate shear, tables and slabbing shear built some years ago by the United Foundry & Engineering Co., Pittsburgh, but never put into service. In fact, it has remained in the custody of the Canadian customs ever since its arrival at Sydney and now returns to the city of its origin in excellent condition for service.

In conjunction with this transaction, the Mitchell-Tappen Co. has added to its organization a department which will handle equipment for rolling mills and steel works, such as blooming, bar and other mills, overhead cranes, ladles, charging machines, engines, pumps, tanks, etc.

The Youngstown Sheet & Tube Co., manufacturer of iron, steel and other products, Youngstown, O., has issued a very attractive calendar for 1917. It contains 12 large two-color photographic views showing the processes used in the company's works in the manufacture of pipe and other products. This calendar will be mailed to any one forwarding his address with 7c in postage stamps to cover cost of mailing.

Great Prosperity

Brings More Business Than Railroads Can Care For

Detroit, Jan. 9.—After a session of many days in which the car shortage and general congestion was investigated, the federal grand jury in session here adjourned without making any announcement as to what had been accomplished. It is understood, as predicted, that the only results is the collection of a mass of data that will aid in bringing about new national legislation that may preclude a repetition or continuance of the congestion in Detroit yards.

During the last week, officials of the Michigan Central, Grand Trunk and other railroads, summoned before the grand jury declared that the prosperity of the nation and Detroit in particular was so great that the roads could not keep up with the procession. Coal dealers blamed the roads for not moving freight rapidly enough. Some of the railroads declared that there should be higher demurrage rates to hasten the unloading of cars and added that some manufacturers found it cheaper to leave merchandise in freight cars than to unload cars promptly.

In the meantime the congestion in Detroit yards remains about the same and the Detroit board of commerce and individuals are doing their utmost to relieve the situation.

Under New Name

On Jan. 8 the Domestic Machinery Works, Wissinoming, Philadelphia, incorporated its business under the new name of Richter Machine Co. Wolfgang Richter of the original firm is president and F. V. McMullin of the Pennsylvania Forge Co. is the secretary and treasurer.

Ready to Buy

John Fisher & Co., Toronto, Ont., factory brokers, have clients who will purchase the rights to manufacture or assemble and market in Canada, road construction, stone crushing, ditching and trench machinery.

The Parkesburg Iron Co., Parkesburg, Pa., which recently purchased the Spring City, Pa., bloomery, is making several additions to the plant.

Patriotic Action

May Enable the Government to Award Contracts for Cruisers

Washington, Jan. 9.—Reductions offered by the Bethlehem Steel Co., and other manufacturers in prices on equipment required for the four battle cruisers authorized by the 1917 naval act will make it possible for the department to award contracts for those vessels without asking for additional appropriations from congress. This at least is the view of Assistant Secretary of the Navy Franklin D. Roosevelt. Mr. Roosevelt, however, made the statement contingent upon the fact that the department may legally forego the payment of the 20 per cent bonus to the makers for expeditious construction. The manufacturers have offered to waive their rights to the bonus, doing this in a spirit of patriotism, which also inspired them to offer to have reductions in the price of materials, after being appealed to in telegrams sent by Mr. Roosevelt. Curiously enough, Secretary Daniels said he did not think the reductions would be sufficient to make the cost of building the vessels come within the appropriation, amounting to $16,500,000 for each vessel, exclusive of armor and armament. Mr. Daniels conceded, however, that he was not fully acquainted with the situation, and did not know how many or what companies had offered to make reductions, this matter being directly in charge of Mr. Roosevelt.

The Bethlehem company, through its president, E. G. Grace, sent a dispatch to Mr. Roosevelt offering to cut 10 per cent from the cost of all material it might contract to supply toward the building of the cruisers. As a general thing, the offers of the other companies are said to have involved similar reductions.

Fifty Million More

Ottawa, Jan. 9.—A further imperial credit of $50,000,000 has been provided by the chartered banks of Canada. This is the result of a conference which took place at Ottawa, between representatives of the banks and Sir Thomas White, minister of finance. Sir Thomas has been informed by the Canadian Bankers' Association that the sum named will be advanced to the dominion government, which will place the amount to the credit of the imperial government, for the purchase of munitions and supplies in Canada. This makes a total of $250,000,000 provided by the banks and the government jointly in advances to the imperial government for this purpose.

MEN OF THE IRON TRADE

Who they are **Where they are** **What they are doing**

FRANKLIN B. RICHARDS, Richard F. Grant and William Collins, who have become members of the firm of M. A. Hanna .& Co., Cleveland, are men who have made a decided success in business and other lines of activity on account of rare natural ability and untiring energy.

Mr. Richards is a native of Massachusetts and a graduate of Massachusetts Institute of Technology. Starting soon after graduation as assistant chemist at the Joliet Steel Works, he worked his way upward and has had a large experience in the manufacture and sale of iron and steel and in the mining and selling of iron ore. His experience includes that of superintendent of Himrod furnaces in Youngstown in 1887, managing ore sales for Tod, Stambaugh & Co. in 1888, superintendent of the Brier Hill Iron & Coal Co. in 1889, general manager of the Buena Vista Iron Co., Buena Vista, Va., 1890 to 1893, and, since 1893, with M. A. Hanna & Co., first in the ore sales department, later general manager of blast furnaces and for several years manager of the ore and pig iron departments. Mr. Richards is a vigorous man, has traveled widely and is well informed on many subjects.

Mr. Grant is a native of Minnesota and graduated from Sheffield Scientific School, of Yale University in 1899. Two years later, at the age of 21, he received his diploma from New York Law college. After spending some years in the Dakotas, he returned to Minnesota and lived for eight years at Duluth. He was elected a member of the Minnesota legislature and served in the house of representatives in 1908 and 1909. He came to Cleveland in November, 1909, as counsel for the firm of M. A. Hanna & Co. He is a lawyer of great ability and oratorical powers of a high order.

William Collins has been at the head of the coal department of the firm for the past six years. He was born at Whatcheer, Ia., about 50 years ago and started at an early age to work in a coal office. He represented the Hanna interests at St. Paul, being manager of the M. A. Hanna Coal & Dock Co., of that city, for a number of years before coming to Cleveland.

Dwight S. Guthrie, manager of sales for the Republic Iron & Steel Co. in the Chicago district, has resigned to become manager of the iron and steel department of the Federal Steel Export Co., New York. He assumed the duties of the new position Jan. 4. Mr. Guthrie became associated with the sales force of the Republic company in 1906, when he entered the St. Louis office as district sales manager. A short time later, he was transferred to Birmingham, Ala., where he had charge of sales in the southern district. In April, 1909, he became sales manager in the Cleveland office, succeeding C. T. Johnston, who is now general manager of sales. Mr. Guthrie remained in charge of the Cleveland sales for seven years, and Jan. 1, 1915, was assigned to similar duties in Chicago. He held that position up to the time of his resignation.

C. H. Eib, who succeeds Mr. Guthrie as manager of sales in Chicago, entered the service of the Republic company in the capacity of salesman Aug. 1, 1899, only three months after the company was organized. During the past few years, he has had charge of the sale of rerolled material in the western territory.

E. A. Amaden, superintendent of the Waverly warehouse of the Carnegie Steel Co., Newark, N. J., effective Jan. 1, was appointed general superintendent of all the warehouses operated by that company. Mr. Amaden will have offices in the Carnegie building, Pittsburgh.

Frank H. Dodge, formerly affiliated with the S. Obermayer Co., Chicago, in the capacity of resident manager at Cleveland, has been appointed resident manager of the Werner G. Smith Co., Cleveland, manufacturer of oil core binders. Mr. Dodge will represent this company in the state of Michigan and part of Ohio.

Geo. C. Hicks Jr., vice president and engineer of the P. H. & F. M. Roots Co., Connersville, Ind., for the past 15 years, retired from the company Jan. 1. Mr. Hicks will act as consulting engineer for the company for a short time. Before taking up work again, he expects to take a six months' vacation.

William Wieman, secretary and treasurer of Banning, Cooper & Co., Ltd., Oliver building, Pittsburgh, resigned, effective Jan. 1. Mr. Wieman had been connected with the Banning-Cooper interests for about seven years and is well known in the iron trade of the central west. George L. Claypool has been elected secretary and treasurer of the Banning-Cooper company.

G. C. Baldwin, superintendent of the Perth Amboy, N. J., plant of the Standard Underground Cable Co., is to supervise the construction of large extensions to the Glen-Willard plant of the company near Pittsburgh. These will include a new rod mill and a cable plant. These additions recently were scheduled to be built in Perth Amboy, but due to the difficulty the company has encountered in making railroad shipments at that point, it was decided to build them at Glen-Willard.

John J. Griffin, for 23 years connected with the Carnegie Steel Co., has been appointed auditor and assistant treasurer of the American Steel Export Co., Woolworth building, New York City. Mr. Griffin is an expert accountant and much of his time with the Carnegie company was spent in the bureau of vouchers and the bureau of freights.

The Kerr Turbine Co., Wellsville, N. Y., announces that, effective Jan. 1, Henry J. Sage, former district manager of the Crocker-Wheeler Co., Ampere, N. J., with offices in the Oliver building, Pittsburgh, will represent the Kerr interests at Boston. Mr. Sage will have offices at 79 Milk street. Roger A. Millar, former manager of the Philadelphia office of the Westinghouse Machine Co., East Pittsburgh, Pa., on Jan. 1 became district manager of the Kerr company with offices at 1216 Stock Exchange building, Philadelphia.

James A. Campbell, president of the Youngstown Sheet & Tube Co., announces the appointment of Walter E. Meub as secretary, creating a new position. Mr. Meub has been with the company eight years.

John R. Lewis, connected with the Pittsburgh office of the Crocker-Wheeler Co., Ampere, N. J., for about 10 years, has been appointed Pittsburgh district manager to succeed Henry S. Sage, who resigned a short time ago to become connected with the Kerr Turbine Co., Wellsville, N. Y.

Largest Tonnage

Ever Held at Close of Navigation by Erie Docks

Lake Erie docks on Dec. 1, 1916, held 10,167,760 tons of iron ore, the largest balance ever held at the close of any navigation season. The Dec. 1 balance, however, has always been reckoned by adding December receipts to the actual ore on dock at the opening of December. In most years, December receipts are insignificant, but in December, 1916, these receipts totaled 1,429,630 tons. This huge tonnage, therefore largely accounts for the record-breaking balance on Lake Erie docks on Dec. 1, 1916, of 10,167,760 tons.

The Dec. 1, 1916, balance, while well above the average, surpasses 1912 by only 87,000 tons. The following table shows the ore held on Lake Erie docks on Dec. 1:

Year.	Gross tons.	Year.	Gross tons.
1916.....	10,167,760	1911.....	9,469,869
1915.....	8,910,351	1910.....	9,797,980
1914.....	8,407,905	1909.....	9,471,428
1913.....	9,261,676	1908.....	9,074,003
1912.....	10,080,798	1907.....	8,010,822

Shipments of ore by rail from Lake Erie docks to interior furnaces last winter aggregated 5,566,946 tons. A similar movement this winter would reduce the dock balance on May 1, 1917, to 4,600,814 tons.

The receipts at Lake Erie ports during the 1916 season were, of course, the heaviest in history. A total of 51,807,272 tons were received at those ports during the year, against 37,967,460 tons in 1915. The previous record had been set in 1913, when 39,099,647 tons were received at Lake Erie ports.

The complete receipts of ore at Lake Erie ports in 1916, December receipts at the same ports, and the ore balance on Dec. 1, are shown in the appended table:

Port.	Receipts, season, 1916.	Receipts, December, 1916.	On dock Dec. 1, 1916.
Buffalo	7,432,220	202,676	438,712
Port Colborne.	138,240	.....	.....
Erie	1,525,031	117,634	625,193
Conneaut	9,588,341	361,076	1,363,550
Ashtabula	11,474,268	268,240	3,266,752
Fairport	2,580,647	42,079	474,930
Cleveland	10,669,745	206,662	1,936,906
Lorain	4,613,929	127,048	1,076,105
Huron	1,324,112	23,003	590,743
Toledo	2,035,160	52,321	394,869
Detroit	425,579	28,891	.....
Total	51,807,272	1,429,630	10,167,760

Lake Erie docks, exclusive of Detroit, received 1,527,164 tons of iron ore in December and forwarded 1,360,767 tons to interior furnaces during the same month. The dock balance on Jan. 1 shows an increase over Dec. 1, the docks at the opening of the year holding 9,804,150 tons. This balance is well above that held at the opening of 1916, the docks on Jan. 1, 1916, holding 7,951,534 tons.

Death of Jas. B. Baird

James B. Baird, president and general manager of the National Roll & Foundry Co., Avonmore, Pa., and vice president of the recently organized Chattanooga Steel Co., Chattanooga, Tenn., died in Cincinnati, Jan. 2, from pneumonia. Mr. Baird, who was 51 years old, was well known in the rolling mill industry. At one time he was manager of the Ellwood Iron Works, Ellwood, Ind., manufacturer of tinning machinery. While connected with that concern he invented and developed many devices which are used in the manufacture of tin plate.

Later, he became manager of the Cincinnati Rolling Mill, with which he was identified until it was absorbed by the American Sheet & Tin Plate Co. Subsequently, Mr. Baird became interested in the Chester tin mill, Chester, W. Va., which also was taken over by the Corporation. Mr. Baird became connected with a new tin mill at New Kensington, Pa., with which concern he was associated until the organization of the American Rolling mill Co., Middletown, O. He was identified indirectly with the American company at the time of his death.

Higher Wages

For Puddlers and Sheet and Tin Plate Workers

Youngstown, Jan. 10. (By wire.)—Puddlers, sheet mill and tin plate workers get substantial increases under the bi-monthly examination held here today. Tinplate workers get an increase of 3 per cent, or 19 cents above base price of $3.50. With all sheets except Republic Iron & Steel Co.'s examined in the bar iron division, the average sales show a 2.15c card, which, if maintained, will entitle the puddlers to about $10.30 a ton. The estimate is to be completed later in the day.

Unfilled Tonnage Increases

New York, Jan. 10. (By wire.)—The unfilled tonnage of the Corporation in December increased 488,744, bringing the total at the end of December to 11,547,286 tons. The December increase is attributed more to reduced operations caused by coke shortages than to new bookings.

Coke Movement Improves

The movement of coke has improved appreciably this week. The Carnegie Steel Co., which was operating only 48 of its blast furnaces during the holidays, now is blowing 52 stacks.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, Jan. 9.—The uncertainty which was injected into the metal markets as a result of the Teutonic peace proposals, and which has been emphasized as a result of further developments in the direction of peace, continues to keep the volume of metal buying at a low ebb, with the result that prices continue to sag off. Owing to this situation most of the metals can be quoted only approximately. Electrolytic and lake copper may be quoted at 28c to 28.50c, delivered 30 days, for January, 27.75c to 28.25c for February and 27.50c to 28c for March. Some January has sold at 28c, and at least one sale is reported at slightly less. At the same time, however, there does not seem to be as much metal obtainable at the prices now prevailing than was the case a week ago. Ordinary casting copper is quoted at 26.75c to 27c, cash, for January.

Occasional sales of spelter are being made but these do not involve much tonnage. Quotations on prime western are as follows: Prompt 9.37½c to 9.50c, St. Louis; January, 9.25c to 9.37½c; February 9.12½c to 9.25c; March 9c to 9.12½c; second quarter 8.75c. Brass special spelter is quoted at about 10.12½ to 10.37½c, St. Louis, for prompt shipment.

The strong tone in lead also has been replaced by one of more or less uncertainty and prices have reacted. January lead now can be had in the outside market at around 7.45c, New York, and 7.30c, St. Louis, and February at about 7.37½c, New York, and 7.25c, St. Louis. The American Smelting & Refining Co. continues to quote 7.50c, New York, but this interest still is out of the market.

The tin market, with the exception of last Thursday, has been dull during the week. Spot Straits was quoted at 43c last Tuesday and Wednesday, at 42.50c Thursday, Friday and Saturday, 42.75c yesterday and 42.62½c today. Banka tin for prompt shipment is offered at 41.75c.

Antimony is an exception among the metals at present. Due to the comparative scarcity of antimony, prices have shown no definite tendency toward weakness, and in some cases higher prices have been done. Spot Chinese may be quoted at 14.25c to 14.75c, duty paid, while January and February shipment from the east is offered at 11.75c, in bond.

Prompt and nearby aluminum prices have reacted further. No. 1 virgin ingots in carload lots now are quoted at 60c to 62c, No. 1 remelted at 55c to 57c, and No. 12 remelted at 39c to 41c.

(For complete prices see page 176)

A Record for Adding Mill Capacity

Market Conditions, Being So Favorable to Steel Makers, the Midvale Steel & Ordnance Co. Has Extended Its Worth Plant and Nearly Doubled the Output Within an Exceedingly Short Period

REWARDS for each day gained in the completion of steel-plant extensions were never greater than during the present times of overwhelming market demand when works' capacities are being strained to the utmost and every ton of finished product is being sold at large profits for the manufacturers. The winning of these rewards of speed and energy, however, must be accomplished in spite of unusually severe and numerous obstacles such as short labor supply, deferred deliveries on materials of construction and on steel works, rolling mill and other types of heavy manufacturing equipment. The conditions now prevailing have been putting to the final test the efficiency and resourcefulness of engineering and operating staffs of various steel companies for carrying out capacity enlargements within the briefest duration of time.

A number of companies have been establishing very complimentary records for themselves in the rapid progress of new construction and among these is the Midvale Steel & Ordnance Co. How this company at its Cambria plant at Johnstown, Pa., built and blew in a modern 500-ton blast furnace within the remarkable time of 85 days, was told by *The Iron Trade Review* in its issue of June 15, 1916, page 1329. The latest feat of rapid construction by this company was accomplished at the new open hearth steel plant extensions at its Worth plant at Coatesville, Pa. This was accomplished under unfavorable circumstances, since before this work was undertaken, a practically new works engineering organization was built up and co-ordinated. Ground for the new furnaces was broken on Nov. 15, 1915; the first unit was put in commission May 9, 1916, an elapsed period of less than six months—175 days to be exact. The completion of the initial furnace eclipsed the world's record for open hearth construction, which was set by the Carnegie Steel Co. in 1906 in its new No. 4 open hearth plant at the Homestead works, Munhall, Pa. The elapsed time of construction in this case was 180 days.

The building of the new open hearth furnaces has been but one of the many enlargements which have been completed or undertaken at the Worth plant since control of the works passed in September, 1915, to the Midvale Steel & Ordnance Co. These expansions have included additional pig iron and raw steel capacity, blooming and finishing mills, forging and machine shop extensions and a variety of other betterments which will materially expand and round out the production of the entire works.

The new open hearth capacity has been built as an extension of the present No. 2 plant. The addition is 125 feet wide and 621 feet long. It consists of eight 70-ton basic furnaces with an annual capacity of about 265,000 tons. Six of these furnaces are now in operation and the others are nearing completion so that the entire new battery is expected to be in service by Jan. 1. The first authorization for this extension provided for six furnaces, but two additional units subsequently were added. With the completion of the additional eight furnaces, the No. 2 open hearth plant will consist of 18 furnaces, of which eight will be of the 70-ton, and 10 of the 50-ton type. The No. 1 open hearth battery is composed of six 32-ton furnaces. The new capacity will increase the steel output of the entire Worth works from 75 to 80 per cent, or to about 600,000 tons annually. Sufficient new gas producers have been added to meet the needs of the enlarged steel works and of heating furnaces in the blooming and forging departments.

The pig metal for the open hearth furnaces is charged hot and is obtained from the company's own group of blast furnaces which is located about 1 mile from the steel works. From the blast furnaces, the metal is carried in 35-ton ladle cars and is delivered to a 400-ton metal-mixer, located in the No. 2 plant, about midway between the old group of open hearth furnaces and the new extension. The ingots from the No. 2 steel plant are cast in slab form for the rolling of plates or in special forms for the forging department. In the No. 1 plant only slab ingots are cast. The crane service for the charging floor in the No. 2 plant is furnished

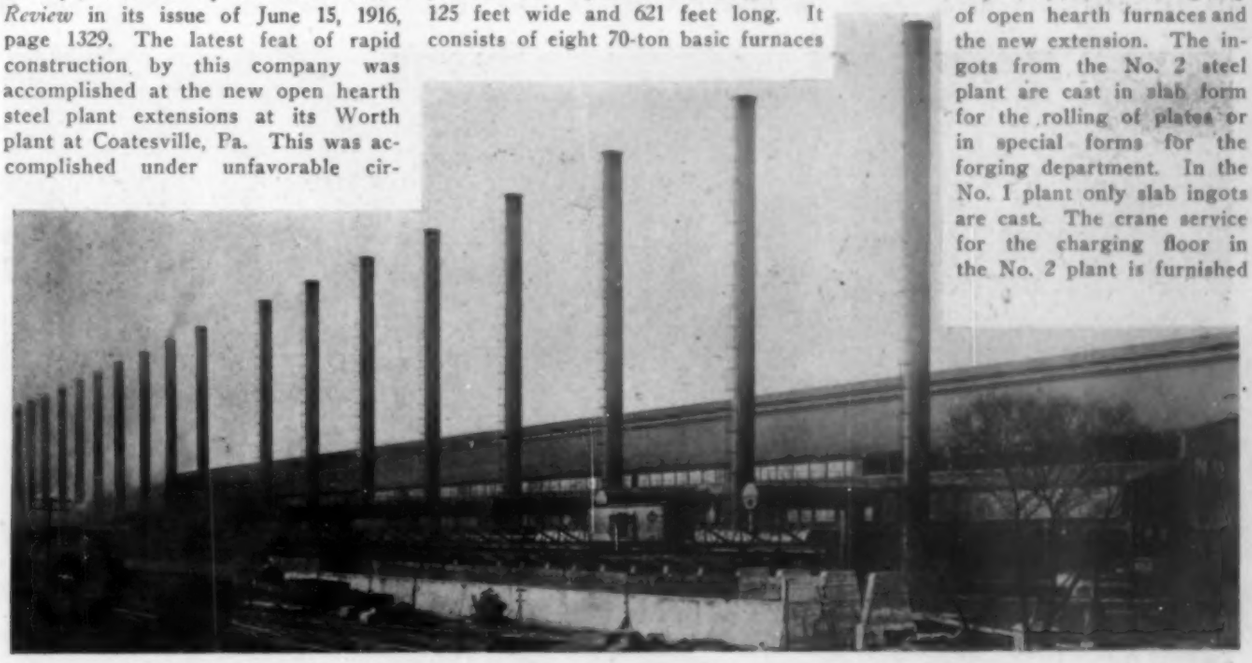


FIG. 1—EXTERIOR VIEW OF NO. 2 OPEN-HEARTH BATTERY AT THE WORTH PLANT WITH NEW EXTENSION IN FOREGROUND

FIG. 2—CHARGING SIDE OF NEW OPEN-HEARTH FURNACES

by three 75-ton machines having a span of 60 feet 6 inches. One of these, of the Morgan type, is new. A 10-ton Morgan crane is used for light duty. On the pouring side, there are three ladle cranes, including one new Morgan unit which is of 125-ton capacity and has a 55-foot span. There also are 12 25-ton cranes, 55-foot span, for the handling of molds, cinder and for other lighter duty. All ingots for plate-finishing are broken down direct. The plate ingots vary in size in accordance with the mill. The largest used are 22 x 68 inches. There are four plate mills in the works, one 90-inch, 2-high, and three others with 114, 132 and 152-inch stands respectively, all mills of the 3-high type. All forging steel goes through the blooming mill. The new blooming mill is located immediately south of the No. 2 open hearth and occupies a building 80 feet 6 inches x 416 feet. There are 12 soaking pits, gas fired, with a capacity for holding four to six ingots each. Because of the congested condition of the works site, the pit furnaces have been located in the end of the blooming department farthest from the open hearth plant. Valuable time in getting its blooming capacity in operation would have been lost by the company had it waited upon the rolling mill builders to deliver from a new order. Consequently, the company bought two idle blooming mills in eastern territory and out of these made up the present 40-inch unit. One of these mills was obtained from the old plant of the Pottstown Iron Co., Pottstown, Pa., and the other from the works of the Tidewater Steel Co., Chester, Pa., now dismantled. A new 62-inch electric saw of the Mackintosh, Hemphill type, driven by a 300-horsepower Sprague Electric Co. motor, has been installed. This saw is located alongside and at about the middle of the runout table. The mill is driven by a Southwark reversing steam engine which formerly had been in use in the plant.

Munition Rounds Being Rolled

The blooming mill and saw are served by two 10-ton capacity cranes, each with a span of 77 feet, which carry the ingot from the pits to the approach tables. The mill now is rolling large rounds for munition purposes, producing diameters up to 14 inches. These are said to be as large as any rounds now being rolled in the country for munition manufacture. The Carnegie Steel Co. has been rolling 15-inch rounds, which are sliced into blanks for the manufacture of steel wheels. Some other large rounds now being rolled at Coatesville are 13¼, 12¾ and 10⅜ inches in diameter. The rounds are broken down from 21½ and 25½-inch square ingots and are rolled out to 22 and 23 feet lengths. The blooms are required by the specifications of the purchasing governments to have a 32 per cent discard. The steel first goes to the saw and is cropped 28 per cent on

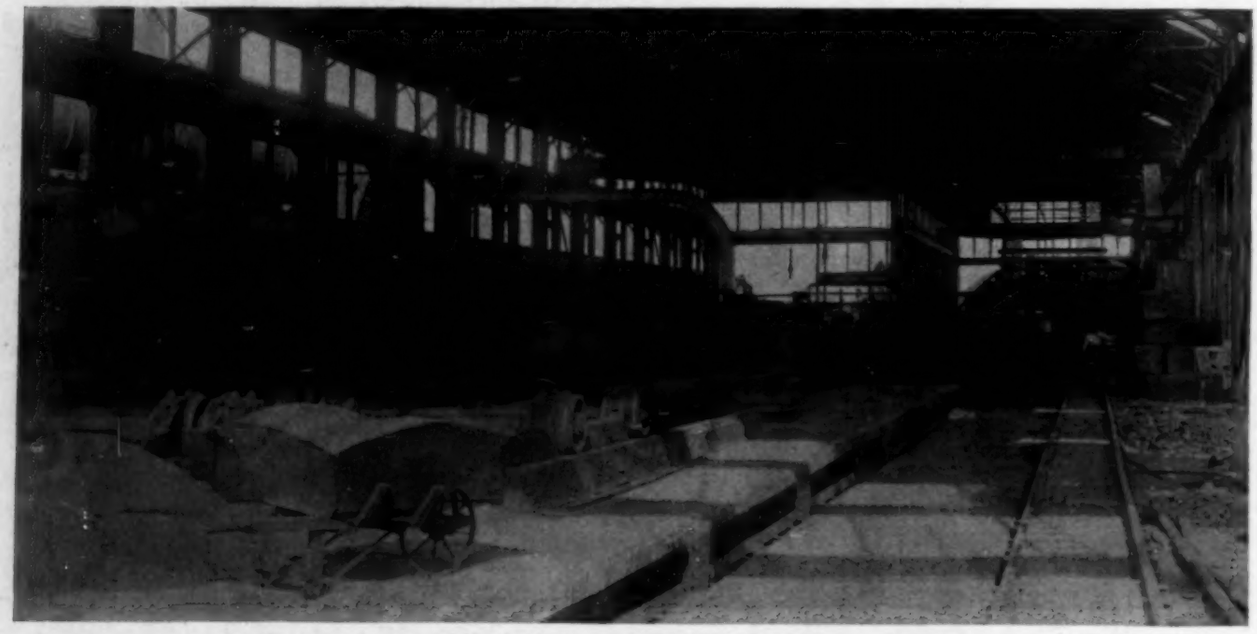


FIG. 3—SOAKING PITS AND RECONSTRUCTED BLOOMING MILL IN POSITION

one end and then is sawed in two and the final crop of 4 per cent taken from the end of the second piece. At the end of the mill table an old type Morgan 9 x 9-inch shear has been set up for use when slabs are rolled. A 10-ton Alliance crane with a 43-foot 5-inch span operates over the shear.

How the Blooms are Handled

From the saw, the blooms cut to size, roll down a transfer to the cooling beds in the slicing yard which, on the east, parallels the blooming mill building for its entire length. After cooling, the piece is sliced on a special slicing machine with six heads, to within 4 inches of its full thickness. This machine is shown in Fig. 4. The fracture is completed on a breaking-off machine. The bloom then is chipped, inspected and is passed to the forging department. The present forging department is the successor to the old plate flanging plant. The former buildings of the flanging department have been extended largely. This department is fitted with a complement of coal-fired furnaces, hydraulic presses of large capacity, draw benches, cooling pits, etc. Two additional furnaces, a 750-ton hydraulic press and other equipment, now are being installed which will increase materially the output of this department. In the forging plant, the rounds first pass through the reheating furnaces and then to the hydraulic presses where they are pierced, and finally through the draw benches where the forming operation is completed. A high rate of production has been worked up and the daily output of rough forgings is a matter of hundreds. The forgings are placed by cranes in cooling pits especially constructed for this purpose and from there are loaded into cars for shipment. A six-prong carrier operated by a crane conveys the forgings from the pits to the cars.

FIG. 5—NEW OPEN-HEARTH FURNACES UNDER CONSTRUCTION

Plans now are being carried out for increasing the pig iron capacity of the Worth plant to satisfy the greater demand for hot metal created by the enlarged open hearth steel works. A new blast furnace in connection with the present group, is partially built. The plate work of the shell and dust-catcher is completed, but it will be several months before the new furnace will be ready for operation. The new stack will be 95 feet high, 22-foot bosh and will have an annual capacity of 160,000 tons. It will increase the pig iron group of the Worth plant to three furnaces, with an output of about 500,000 tons annually. The blast furnace ore yard is being extended. The open hearth ore yard has been enlarged. The old plate flanging department which was removed to make room for the shell forging plant is being reconstructed in a building, 73 x 598 feet, to be served by two 10-ton cranes of 69

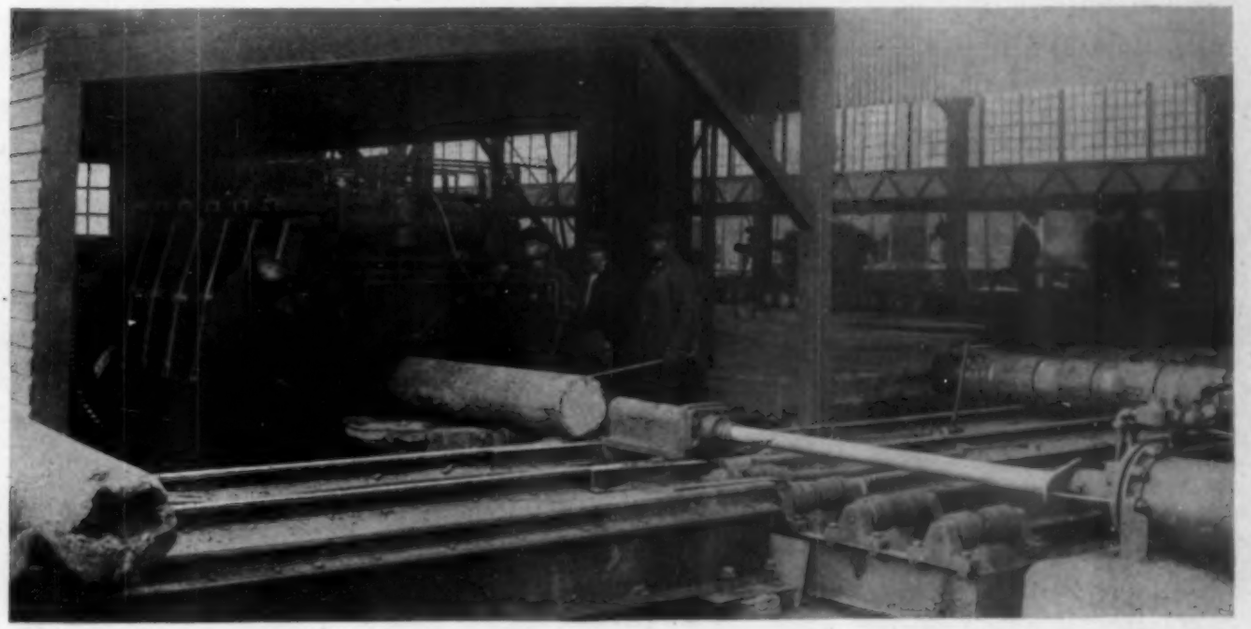


FIG. 4—SPECIAL SLICING MACHINE FOR CUTTING CIRCULAR BLOOMS TO SHELL FORGING SIZE. SLICED BLOOMS SHOWN ON RIGHT

FIG. 6—CHIPPING AND COOLING BEDS WHERE SHELL BLANKS ARE PREPARED FOR FORGING PRESSES

feet 6 inches span. It will be supplied with complete flanging equipment and is expected to be in operation by Jan. 1, 1917. The general power plant has been increased by the addition of two 750-kilowatt, turbine-driven generators. The steam generating capacity has been extended by the installation of eight 604-horsepower, Babcock & Wilcox, coal-fired boilers arranged in batteries of two and fitted with Combustion Engineering Co.'s stokers. The new boiler house is 46 x 184 feet. This plant has been in operation since July 27, 1916.

Another new group of buildings of a very modern and substantial character now well advanced in construction consists of a machine shop, 130 x 320 feet with two 35-foot balconies running lengthwise and a smith shop, 75 x 130 feet, alongside. Between the machine and smith shops is a crane runway, 280 feet long and of 75-foot span. This department will be devoted to general plant repair work. It is planned ultimately to build most of the rolling mill equipment, exclusive of the engines, required by the company in these shops.

Plan Houses for Employes

The present industrial activity of the city of Coatesville, growing out of the extended operations of the steel companies and other plants, has made the housing problem an acute one. The Midvale Steel & Ordnance Co. has been building barracks for its workmen and will further extend its efforts in this direction. It also has worked out plans for the establishment of a new residential community on a site on the hills overlooking the Worth plant. In pursuance of this scheme, appropriations have been made for the erection of 71 modern residences ranging in cost from $3,500 to $6,000 each, and also of a 105-room hotel, for the accommodation of the officials and higher skilled employes.

Welded Pipe Bends

Neal Trimble McKee, Yonkers, N. Y., recently patented a method of making pipe bends, assigining his invention to the Locomotive Superheater Co., New York. Should this method prove satisfactory it undoubtedly will eliminate to some extent the use of threaded joints and the older system of joining by elbow. The process involves heating the pipes, slitting each of them for a certain distance from the end, pressing the edges of the slits outward and welding the corresponding faces together. The thickness of the pipe is increased over an area adjacent to the end of the pipes and the pipe bend is closed by welding.

Goggle Not Endorsed

In an article describing a form of safety goggle manufactured by the Chicago Eye Shield Co., Chicago, published on page 1304 of the Dec. 28 issue of *The Iron Trade Review* the following statement appeared: "This type of protector has been tested by the safety department of the Illinois Steel Co. and met the requirements of that company's safety specifications."

We are officially advised that this statement is incorrect. We are informed that this goggle has not passed the Illinois Steel Co.'s test and is not approved for use in its plants.

An official of the Illinois Steel Co. states: "For a number of years we felt the extreme need of providing our men with proper eye protectors, but were afraid to use any goggle with a glass lens, because of the possibility of the glass shattering and making the eye injury worse than it otherwise might be. It is for this reason that we have been, and are, very careful in the selection of eye protectors, and will not buy nor recommend an eye protector which shows a tendency to shatter and fly inside, even though a proper percentage of the lenses may stand the number of blows required by our test."

FIG. 7—SHELL BLANKS, FINALLY INSPECTED AND READY FOR THE FORGING DEPARTMENT

Seven-Day Week Relic of Barbarism

Declares Wm. B. Dickson—Impractical to Establish Eight Hour Day Under Present Conditions—Must Be No Supine Flinching—Speaker Fears He May Not Be Worthy of Title of the Name Radical

BY WM. B. DICKSON
Second Vice President Midvale Steel & Ordnance Co.

I WOULD take as a keynote of the discussion today, the following extract from a speech made last week by C. M. Schwab:

"To make money is a good thing; but it is a far better thing to be able to create opportunities for other men to work out their own salvation in life with happiness and contentment."

It is only fair at the outset to say that in dealing with the questions under discussion, I am not the authorized spokesman of the steel companies. In fact, if the promoters of these meetings had any such idea in view, they could hardly have made a more unfortunate selection, as in matters pertaining to the relations of employer and employe, I am distinctly *persona non grata* to the "powers that be," because of pernicious activity in the past on matters affecting this relation. My friends and former business associates call me a radical, and while they use it as a term of reproach, I gladly accept the title, with the proviso that I am permitted to have something to say as to the definition of the term; and I would accept that of Gladstone, who, when he was asked to explain the difference between the British political parties, replied as follows:

Conservatism—Distrust of the people, tempered by fear.

Liberalism—Trust of the people, tempered by prudence.

A Radical—A Liberal in earnest.

The dictionaries define the word "radical" as follows:

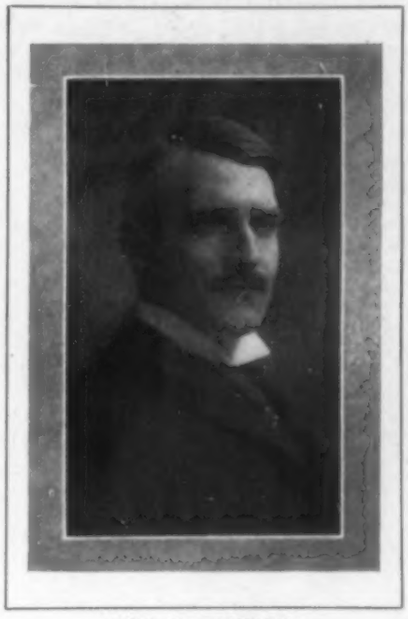
"Of, or pertaining to the root; fundamental; thoroughgoing."

It is as one who, in discussing social problems, aims to deal with fundamental principles rather than with symptoms, that I am wiling to be known as a radical. Indeed, my only fear is, that I may not be found worthy of the name.

To-day, however, while agreeing in the main with the ideas and purposes of those whom you have heard, I shall want to inject an element of conservatism into the discussion. Not, however, using this term in the Gladstonian sense.

Before dealing with the specific questions before this conference, I should like to consider some phases of our modern social organization, with a view of determining some of the causes of the social unrest which is plainly in evidence, not only in war stricken Europe, but in prosperous and peaceful America.

Mr. Carnegie was once asked which was the most important factor in his business—labor, capital, or brains. His reply was in the form of a question—



WM. B. DICKSON

"Which is the most important leg on a three-legged stool?" The proper relationship of these three factors has never been more clearly or concisely stated.

It is important, in such discussions as this, to clearly define the terms used; for instance—"Who are the capitalists?" Well, you will answer, the owners of the securities of our railroads and large industries. Let us see who are the real owners of these securities: I have before me some extracts from the July 1, 1914, report of the comptroller of the currency, which says that: There are in this country, 10,502,438 savings bank depositors, having deposits aggregating $4,667,525,744.98. While we hear and read a great deal of the individual capitalists, men of immense fortunes, it only needs a brief analysis of the figures wihch I have presented to you to show that the real capitalists of this country are the thrifty working-men and women, small merchants and farmers, who, as you know, make up the bulk of these depositors.

> I fear that the average workingman has only a hazy idea of the manner in which his employer gets into his safe, the dollars which he, in turn, receives in his pay envelope. I am afraid he has a vague idea that there is located somewhere an immense reservoir of wealth which we term capital, which is connected in some mysterious manner with the office of every industry, and that the employer could raise the wages of his workmen merely by opening the spigot a little more, if he was not more interested in filling up a little private reservoir of his own.

The workman needs to be educated in the affairs of finance and commerce, so that he will be able to appreciate the numberless hazards and chances of loss which his employer must face every day. To this end, I believe that working-men should not only be stockholders in our corporations, but that they should elect fellow-workmen as directors also, who would thus have an opportunity to come in touch with all of these problems, and who could, in turn, transmit some appreciation of them to the rank and file.

Many an employer has kept his factory running under adverse trade conditions, staggering under a burden of debt rather than see his workmen suffer by an enforced shutdown; and statistics show that 90 per cent of all business men become insolvent at some period of their lives.

The Declaration of Independence proclaims as the inalienable birth-right of every human being, the right to "life, liberty, and the *pursuit* of happiness." I would like to amend the last expression to read—"the attainment of happiness," or, at least, a reasonable opportunity for its attainment.

James Macayse has said—"Everywhere we are taught that life is sacred, that liberty is sacred—but where are we taught that happiness is sacred?" And yet, it is only because of their relation to happiness that these other things have a trace of sacredness."

You may be surprised to have me name as one of the causes of social unrest in our day, the modern factory

Address delivered at Ohio State University, Columbus, Dec. 29, at annual meeting of American Association for Labor Legislation.

system which we are accustomed to hear extolled to the skies as one of the most notable evidences of our progress toward a higher civilization. I confess approaching this subject with a good deal of hesitation, because it is not easy to reason this problem to a satisfactory conclusion. It is my earnest belief, however, that the man who, day after day for the best years of his life, is a mere cog in the complex organizations which go to make up our modern factory system, is bound, in spite of himself, to be stunted mentally, morally, and physically by the dreadful monotony of his task. I have in mind such operations as wire-nail factories, where, amid the ceaseless deafening dim, a man stands tending automatic machines pouring out an endless stream of nails. How much pride of achievement can be associated with such a task? Or, even worse, the workers in the dust-laden, lung-destroying cement, acid, and fertilizer works.

The village blacksmith of our father's days, who would shoe a horse in the morning and make a chain or build a wagon in the afternoon, was a better all-round citizen than the man who stands all day shut out from sunlight and fresh air, feeding some automatic machine, in the product of which he can have little pride. And this is not because the old-fashioned blacksmith was inherently a better man, but because of the inevitably narrowing effect of the work.

I recently had occasion to employ an elderly Italian sculptor. He told me that as a young man in Italy, he had worked in a shop where sporting rifles were made. He was an expert mechanic, and according to his story, made practically the whole weapon, and when it was completed, he had in it the same pride which any artist or skilled workman has in the product of his hand and brain. Coming to this country, he secured employment in an arms factory in Connecticut, where he was placed on a stool beside a long bench occupied by a row of workmen. To his disgust, he found that his work consisted in taking a small part from his right-hand neighbor, filing it a little, and passing it along to his left-hand neighbor. After working a few days, heart-broken at what he felt to be a prostitution of his abilities, he threw up the job and found work as an assistant in a sculptor's studio where, at least, he could have some pride in the work of his hands.

I believe this very thing of which we are so proud is full of menace to our civilization, and that there was more of the joy of living among the rural population of 100 years ago than among a large proportion of the factory operators of today.

As I said before, I have approached this subject with some hesitation. The only remedy that I can suggest is that where work, because of its deadly monotony, is narrowing in its influence on mind and body, the operative should, by reason of shorter working hours, have ample time to devote to a more rational method of living; and to this end, instead of our factories being the adjuncts of large cities, they should be distributed throughout the country districts, so that every operative, instead of living in tenements and small apartments, could have his own little home surrounded by several acres of land, on which, by hours spent in God's open air and sunlight, he could utilize his spare time in the cultivation of vegetables and fruits for the sustenance of the bodies of his family, and of flowers for their souls.

The individual man, as well as the nations, has a right to his "place in the sun."

Permit me here to make a digression from the main topic of the day.

You will remember that amiable creation of Dickens—David Copperfield's friend, Mr. Dick, who was constantly bothered by the intrusion of King Charles' head, just as he was about to accomplish something really great in the literary lines. I, also, have what my friends are pleased to call my pet delusion, which, in spite of myself, intrudes itself upon my thought whenever any subject related to social economics is under discussion.

Paying a Fearful Price

The most important raw material of our factories is seldom mentioned in their system of accounting, namely, human lives and characters, but the finished product is made up of these elements just as really as of wood or steel or cotton.

Cheap factory products would seem to be a vital necessity to our civilization, but if in producing them we are debasing our manhood and womanhood, yes, and O, the pity of it, that we must include our child workers also, we are paying a fearful price for them.

Monopoly of Natural Resources

Ever since the cave man commenced to use weapons and tools and to have a fixed place of abode, there seems to have been an irrepressible conflict between property rights and human rights. The earliest recorded history is filled with accounts of efforts to formulate a social scheme which would establish some measure of equilibrium between these two rights, each of which seems to be of fundamental importance in a civilized state. Today the problem is pressing for solution just as it did in the early Greek and Roman Republics, 25 centuries ago. In this connection I would urge all of you to read Plutarch, and see how many of our so-called modern social problems are as old as history.

One of the great economic questions of today, as of all the past, is this: "How shall the great natural resources of our country be reserved for the use of their real owners, the whole people?" By natural resources, I mean primarily, land and all the material things which exist, not as the result of man's labor or thought, but as a gift to mankind, direct from the hands of the Creator of the universe; such as coal, gas, oil, ore, potable water, navigable streams, and water-power.

I lay down as my premise this fundamental principle: That the real ownership of all these things is vested in the whole people, and that all the laws ever passed by legislatures, and all the musty legal documents lodged in all the courthouses on earth, cannot change this fundamental truth.

Let me quote from an English and an American writer. Ralph Waldo Emerson says:

"Grimly the same spirit looks into the law of property, and accuses men of driving a trade in the great boundless providence which had given the air, the water, and the land to men to use and not to fence in and monopolize.—("The Times.") I cannot occupy the bleakest crag of the White Hills or the Allegheny range, but some man or corporation steps up to me to show me that it is his.—("The Conservative.") Touch any wood, or field, or house-lot on your peril; but you may come and work in ours for us, and we will give you a piece of bread.—("The Conservative.") Of course, whilst another man has no land, my title to mine, your title to yours, is at once vitiated.—("Man the Reformer.")

Thomas Carlyle in "Past and Present," Book III, Chapter viii, says:

"Properly speaking, the land belongs to these two: To the Almighty God; and to all his children of men that have ever worked well on it, or that shall ever work well on it. No generation of men can or could, with never such solemnity and effort, sell land on any other principle: it is not the property of any generation."

How did these great natural resources come to their present owners? Let me quote from another English writer, Herbert Spencer:

"It can never be pretended that the existing titles to landed property are legitimate. The original deeds were written with the sword; soldiers were the conveyancers; blows were the current coin given in exchange, and for seals, blood. Those who say that time is a great legalizer must find satisfactory

answers to such questions as—

"How long does it take for what was originally wrong to become right?

"At what rate per annum do invalid claims become valid?"

I can imagine some of my hearers saying—"What wild-eyed anarchists gave utterance to such nonsense?" Well, these are the utterances of men who are honored by all the world as among the greatest thinkers of the nineteenth century—Herbert Spencer, Ralph Waldo Emerson and Thomas Carlyle. Spencer had in mind the great landed estates of England, entailed from father to son and tilled by men only a little above the condition of serfs, and who could never hope to rise above the level of agricultural laborers, making barely enough to keep body and soul together. In this connection, I have heard the statement made that half of the land of England is owned by about 2,500 men. Whatever may be the number, we know that it is comparatively small and that the land is enslaved.

I believe this condition to be the principal factor in causing the social unrest which was so much in evidence in England prior to the war, and which has produced such a condition that in London, the richest capital in the world, it has been estimated that 35,000 homeless men, women and children have walked the streets on one night, of each of whom it could be said as of another outcast from society—"He had not where to lay his head."

And it is my opinion that the social unrest in Germany prior to the war, which was evidenced by the steadily increasing voting power of the Socialist party, had as its principal cause the concentration of land ownership by the so-called Junkers. In considering legality of title of the present holders of the bulk of our natural resources, I should have to paraphrase Spencer's statement as follows:

"The original deeds were written in fraud; unscrupulous lawyers and servile legislators were the conveyancers; political contributions and bribery were the current coin given in exchange; and for seals, the bloody sweat of unrequitted toil throughout future generations."

In an endeavor to clarify my own thoughts on this subject, I have tried to formulate what I call—"A Twentieth Century Creed," as printed on this page.

This is the ideal toward which mankind should strive to advance. In order, however, to minimize the hardship to innocent persons who now have a legal claim to natural resources, the period of readjustment to the ideal state should be a gradual one, probably extending over several generations.

To this end, on all natural resources now held by private ownership, there should be imposed a cumulative tax. This would compel the present owners to do one of three things, namely:

First—Utilize to the fullest possible extent these resources, so that they would produce an income sufficient to pay the tax plus some profit. This would, of course, add to the common wealth.

Second—Dispose of these resources to those who were willing and able to use them productively.

Third—Abandon them to the taxing power, i. e., the state or nation.

The cumulative tax should be so devised that it would be practically impossible for any private owners to hold a large reserve of natural resources out of use. This would eventually result in government ownership of all natural resources not actively being exploited, with access to them by all users, present and potential, on equal terms. This does not necessarily imply that the government would engage in the exploitation of natural resources, (though in some cases this may be advisable) but that the government should be the custodian of all reserves of natural resources and thus keep the door of opportunity open to all citizens. It is desirable that efficient men or organizations should have every opportunity to develop natural resources, but they should not be permitted by so-called ownership of reserves to prevent equally efficient men or organizations from doing the same.

A Twentieth Century Creed

By Wm. B. Dickson

"And they shall build houses, and inhabit them; and they shall plant vineyards, and eat the fruit of them.

They shall not build and another inhabit; they shall not plant and another eat."—Isaiah 65; 21-22.

First—Every human being has an inherent, inalienable right to life, liberty, and a reasonable opportunity for the attainment of happiness. These are human rights as distinguished from property rights, and are limited only by similar rights of all other persons.

Second—These rights can be curtailed only as a result of the act of the individual himself.

Third—Human life, being dependent on close and continuous contact with natural resources, the exercise of human rights necessarily implies free access to these resources.

Fourth—There are no inherent, exclusive property rights in the natural resources, such as land, water, air, minerals, oil, gas, natural forests, etc., all of which exist not as the result of man's labor or thought, but as a gift direct from the hand of the Creator of the Universe.

Fifth—As a corollary to the foregoing, exclusive individual property rights are limited to the products of man's labor or thought.

Sixth—Where human rights and property rights conflict, the former must always prevail.

The great achievement of the nineteenth century was the final recognition of the inherent wrong of human slavery, and the abolition of this iniquitous institution.

It is my firm conviction that until it is accomplished, the great issue which will continue to confront the twentieth century is the breaking of the legal shackles which hamper the use of our natural resources by their real owners, the whole people; and that this overthrow of our false system of property ownership will solve many other social problems which, while serious in themselves, are of minor importance as compared with this great issue.

And lest my hearers should take my reference to King Charles' head too seriously, and feel that I have gone far afield in reverting to this subject, let me show how I relate it to the particular question before us:

If the land, and all other natural resources are freed, so that the same type of enterprising men of this and future generations who in former generations pushed our frontier from the Alleghenies to the Pacific ocean, and created that great central and western empire, will have the same facility of access to natural resources, the question of conditions of employment, including wages and hours, will solve itself in a natural evolutionary manner.

Under such conditions, the factory, in order to obtain workmen, will be compelled to compete with the farm and garden on an even basis, and I have enough confidence in the intelligence of the average workman and in his natural preference for an opportunity to live the life of a normal human being in God's open air and sunlight, to believe that under such conditions, the factory and mill will be compelled to establish and maintain high standards if they hope to be successful in this competition.

And now let us consider the definite question before us:

The recent action of the steel company in seeking relief from certain New York state restrictions, has indicated the handicap under which an employer may have to operate when the state laws governing conditions of employment are more stringent than those under which his competitors operate in adjoining states. If, to this domestic handicap, there is added the danger of competition from foreign makers not subject to like restrictions, it is evident that we have here the elements of a serious situation. This would indicate the necessity of federal instead of state control, and also injects into the situation the vexed question of protective tariff laws,

or the even more drastic question of trade embargoes.

This is another argument, if any were needed, for the wiping out of state lines in all matters of legislation which affect the nation as a whole.

There are two methods by which changes in the social status can be made; by evolution and by revolution. This country has had a bitter experience of the latter method. This generation is far enough removed from the passions which were engendered by the civil war, to see some of the phases of that conflict and of the causes leading to it, in their true perspective.

If the abolitionists had given more consideration to the fact that human slavery, as it existed in the fifties, was an evil inheritance from past generations, and that the blame for it was properly chargeable on the New England merchants who had trafficked in slaves, and in the products of slave labor, as well as on the actual masters of the slaves; and if, on the other hand, the southern planters had not permitted their prejudices to affect their ability to properly estimate the force of public opinion on the question of human slavery, it does not seem as though there should have been any insurmountable difficulties in freeing the slaves at a cost to the whole country which, while amply compensating their legal owners, would not have been a tithe of the money cost alone, of the war—leaving out of account the lives sacrificed and the arrested developments of the southern states.

The Seven-Day Week and the Twelve-Hour Day in the steel industry are evil inheritances from a former generation, and I regret to say that the company with which I was identified for many years, was not blameless in maintaining these conditions.

It seems to me that in considering this industrial question, we should seek a solution along evolutionary lines rather than revolutionary. It is perhaps fortunate that in the majority of the continuous processes, there are only two alternatives—a twelve-hour day, or an eight-hour day. The issue is thus made clear.

There are two principal difficulties to be considered:

First—The adjustment of the old wage rates to the new conditions;

Second—The securing and training of the additional men required.

If a certain position now pays $3.60 for 12 hours' labor, the cost of 24 hours' labor to the employer is $7.20. If this same total cost is to be distributed among three men working only eight hours each, the pay of each is reduced to $2.40, or a reduction of 33 1/3 per cent.

On the other hand, if the same rate of pay per man which was paid for 12 hours is now paid for eight hours, the total cost to the employer for 24 hours is increased to $10.80, which is an increase in his labor cost of 50 per cent. It is not reasonable to suppose that workmen could submit to any such radical reduction in their pay—certainly not under existing conditions.

On the other hand, the increase of 50 per cent in the labor charge to the employer is too radical to be considered by anybody except the impractical theorist. It is apparent, therefore, that if the eight-hour day is to be adopted in the continuous industries, it must come as the result of a compromise on the question of wages; and in addition, the employer must be given a considerable period in which to adjust his business to the new conditions.

As to the second proposition, i. e., the securing of a sufficient supply of labor, this would, of course, mean that where a factory now operates with 1,000 men working 12 hours, an additional 500 men would have to be found, housed and trained, to provide three shifts.

Under present conditions, it is only necessary to state this problem to show how completely impracticable it is.

Immigration Suspended

The usual source for increase in labor forces, i. e., immigration, is shut off, and the natural increase is entirely inadequate to meet the requirements of our rapidly extending industries. This has brought to the front a resource which I fear contains within itself a serious menace to living conditions of our working-men, namely the steadily increasing stream of negro laborers from the southern states. I have been informed by one in position to know the facts that in the past year there have been employed at the works of a prominent steel company in the Monongahela Valley over 4,000 negro laborers. I have no unreasoning prejudice against the negro. I am ready to concede that he has the same right as myself to life, liberty, and a reasonable opportunity for the attainment of happiness, but I also believe that no good can come to either race by an attempt to amalgamate them socially or economically, and that this sudden influx of negro labor into our northern industrial centers is full of menace to all concerned. Workmen, and those who advocate sudden changes in our industrial system, should consider whether they may not for a time at least—"rather than the ills they have than fly to others that they know not of."

There should be no supine flinching from this issue, however, and if the leading employers are not willing to co-operate in the abolition of the 12-hour day, then the power of the government must be invoked to compel a readjustment to more humane conditions.

> As to the seven-day week in the steel industry, I had hoped that this relic of barbarism was a closed issue, but from the recent action of a large steel company, it would seem that this "snake was only scotched but not killed." I will not insult your intelligence by making any plea for the obolition of the seven-day week.

Some years ago, the officers of a prominent steel company issued a circular to their stockholders in which the statement was made that a large number of men had left their service rather than be deprived of the privilege of working seven days a week. It would seem to me a fair assumption that if this statement was correct, it would indicate one of two conditions:

First—These men were either originally of a low mentality and brutish instincts, or else they had been brutalized by the conditions of their employment, or

Second—The wages paid to them were insufficient to meet their living expenses unless they worked seven days a week.

It would be interesting to see on which horn of this dilemma the signers of the statement would choose to be impaled. The great pressure for output, due to the tremendous demands on the steel companies, has no doubt led to a relaxation of the rule adopted by some of the steel companies, but there can be no permanent backward step in this movement, and I have sufficient confidence in the wisdom of those men who are responsible for these companies, to believe that for business reasons, if for no higher motives, the high standards heretofore set will be maintained.

And now, in conclusion, while, as I said in the beginning, I desire to inject this element of conservatism into today's discussion, I cannot close leaving you under any misapprehension as to my personal views. As a general proposition, I believe in the eight-hour day in all industries *where the only other alternative is the 12-hour day.* I am on record publicly on this question, and I am confident that eventually and in the near future this condition will be brought about.

These issues have been on trial before that great American court of last resort, Public Opinion, and a verdict has been rendered against any system of employment which denies to the worker, an opportunity to live a normal human life. The employers in facing these issues have, in the main, as so many times in the past, mistaken mere inertia for true conservatism and it behooves them to put their houses in order, for the doom

of these unsocial practices is writ large on the scroll of fate which is slowly unwinding from the knees of the gods.

An enlightened social conscience has revolted against conditions whose inevitable consequences are so vividly set forth in Edwin Markham's poem, "The Man with the Hoe."

Develops Time Limit Overload Relay

A new type of time-limit overload relay, which is particularly applicable to those systems where extreme accuracy in timing is required, has recently been developed by the General Electric Co., Schenectady, N. Y.

The relay is designed for use in the secondary of current transformers. The normal load rating is five amperes. By means of a current tap plate and a metal tap plug, portions of the relay winding are cut out. In this manner the relay may be set to operate at four, five, six, eight and 10 amperes. Positive operation is obtained at any setting throughout this range.

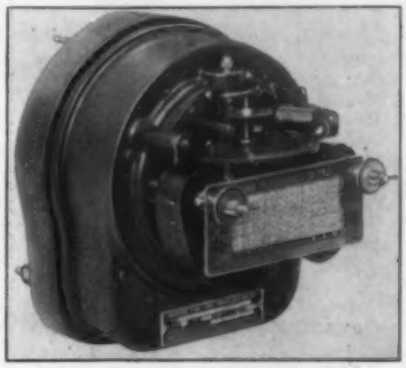
The contacts are closed on overload by the rotation of a disk actuated by a U-shaped driving magnet with shading coils on the pole pieces. No tripping current is carried through the revolving parts. When the contacts have been closed they are firmly held in that position until tripping occurs by the armature of a holding coil connected in series with the contacts, the trip coil of the air or oil circuit breaker and an auxiliary switch which opens when the breaker is tripped. This insures current on the trip coil continuously until the circuit breaker opens, and prevents flashing at the contacts.

To obtain a given current setting it is only necessary to insert the metal tap plug in the current tap plate at the desired current marking. Time settings are obtained by moving a small lever in the front and near the top of the relay to the graduation mark representing the column in which the desired time appears.

The operating or characteristic curves for the various time-current settings are entirely separate and distinct at even the heaviest overloads and it is said they never become instantaneous. It is claimed that the heaviest overloads do not disturb the form of the curve nor cause vibration of the moving parts. The relay operates in a period of time which varies inversely with the lower current values and approaches a definite minimum time for the higher current values.

Lubrication of Rolling Mill Machinery

The lubrication of the various parts of blooming mills has been given but very little serious attention among mill operators. In general practice, it seems, the problem is largely one that is individual with each mill and has been solved to the best of the foreman's ability with the meager makeshifts at hand. The most difficult of bearings to lubricate properly is the roll necks which must stand an intense heat and at the same time the effect of a stream of cold water. According to *Lubrication*, a publication issued by The Texas Co., New York, the rapid heating tends to burn out the oil, leaving the grease too hard. It is only the oil in the grease that lubricates. The lower the temperature at which the grease can be melted, the richer the grease will be.



TIME LIMIT OVERLOAD RELAY

After the grease has been melted, it should be allowed to stand for a couple of hours until the sediment has had a chance to settle out. One superintendent of a mill stated that his company had a standing order for all the suet several butchers could supply. Although as a rule, this expedient was found to be satisfactory, shutdowns occasionally occurred even when pure, sweet suet was being used on the journals.

"Mineral grease for cold necks is generally built up from a pine tar base, with some rosin added, and an asphaltic base oil is used, as its adhesive qualities are deemed better than those of a paraffine base oil and high melting point is not so important a factor. In some greases, graphite is added which aids the lubricant in resisting water."

It has long been the consensus of opinion among set screw manufacturers, that the old standard for size of head is unnecessary in point of practical service. Therefore, the National Acme Mfg. Co., Cleveland, has adopted a new standard in which the height of head is equal to three-quarters the diameter of the body. These dimensions will be used for all sizes of set screws carried as standard stock. However, the company states that until 1917 either the old or revised style of heads may be considered regular and will be carried on hand for the convenience of cutsomers.

Determines Critical Temperatures

The Leeds & Northrup Co., Philadelphia, has developed an apparatus for the location of thermal transformation points which is designed to fulfill the stringent requirements of metallurgists in heat-treating processes. The method consists essentially in heating a small sample of the metal in contact with a larger neutral body and simultaneously measuring the temperature of the sample by a thermo-couple and the temperature difference between the sample and the neutral body by a different thermo-couple while the furnace is being slowly heated and cooled. The apparatus plots these two quantities as co-ordinates upon a rectangular chart. The critical temperatures are easily recognized on the chart from the slope changes of the curve.

George W. Klages, a manufacturer of window glass cutting tables and tools, as well as scientific instruments, North Side, Pittsburgh, gives some very interesting evidence concerning the use of steel lettering stamps when handled by expert workmen. He states that two carbon tool steel, heat-treated stamps, made by Jas. H. Matthews & Co., Pittsburgh, have been in continuous use in his plant for nine years, that he has made at least 20,000 impressions with each stamp, and that the stamps have been used by many of the workmen, so that each stamp has given at least 40,000 impressions on cold rolled steel. The stamps were originally 4 inches long and the heads have worn down until they are only 2 inches in length, so that it is necessary to wind them with tape to prevent them rebounding from the hand during the marking operation. The face of the stamps has not, however, worn down to any extent and therefore, if it were possible to hold them in the hand, they would no doubt give many more impressions.

The twenty-fourth annual edition of "The International Mining Manual" has just been published by the Western Mining Directory Co., Chicago. It contains 420 pages, giving a list of metal mines, mills, smelting and refining plants in the United States, Canada and Mexico.

An Organization for Preparedness

Back of the Battle Line Stand the Work Shops of the Nation—America Will Be Ready Industrially—Iron and Steel Business the Most Important Factor in Industrial Preparedness

BY L. W. MOFFETT

TRAINED civilian minds have been mobilized to assist in securing the national defense of the United States. While the country has in the past turned to civilians with good effect to improve its military standing, never before was the latent inventive genius throughout the land so organized to co-ordinate a vast, comprehensive system of industrial preparedness, a system that is to be ready for immediate operation after war has been declared. It is planned to have every one of the steel mills, machine shops, foundries, mines, railroads, and in fact, all the tremendous physical resources of the country ready to respond to a flash from the telegraph wire, or to any other sudden summons. If the necessity arises, these great agencies are to be transformed from a peaceful to a war basis, and are to be operated at top speed with every ounce of energy exerted for the defense of the nation.

It was a civilian who produced the MONITOR, who constructed the first submarine, who mastered the science of flight, who perfected wireless communication, who invented the gyroscope compass, the electric steering gear and electrical ship propulsion. It is quite natural, then, that trained civilian minds have been selected as the keystone of the arch of industrial preparedness. The European war has demonstrated in striking manner that a nation, no matter how great its resources, must know what they are, where they are and how to utilize them to the best advantage in the quickest possible time, if it is going to defend itself adequately. Immense loss of life, property and strategical position resulted at the outset of the great European war largely because the trained minds in invaded or threatened countries had not been called into service to bring about industrial preparedness. Another country had taken this highly essential factor into account, was prepared, moved forward, crumbled fortifications, and was stopped only in the nick of time in its advance toward a quick victory at the cost of a shocking number of lives. Industrial preparedness would have meant a far different story, and there are those who think it would have meant no war.

Germany, by the supreme domination of the military element brought all its citizens to contribute to the advancement of the art of war. This could never be in such a country as ours, but the sense of patriotism must ever be awake in each citizen and every one should feel that it is his duty to be prepared, just as much as if he were in the army or navy. This is the keynote of preparedness.

Do Your Share

Official Washington, spurred to action by the initiative of American business men and engineers, is busily engaged in putting through a vast program of industrial preparedness. The movement is headed by the Naval Consulting Board and the Council for National Defense created at the last session of congress. Several other quasi-official and unofficial bodies also are actively engaged, and as this article points out, a method has been devised to coordinate the activities of the several agencies at work to the end that when the war toscin sounds again in the United States, the country will be ready.

As Mr. Moffett's article also shows, the iron and steel industry stands at the very center of the industrial preparedness problem. Everyone connected with the manufacture of iron and steel, therefore, should be thoroughly familiar with the latest plans for industrial preparedness, in order to be in a position to help the cause along by advice and action. This is more than a privilege: it is a duty. Act!

Now that the great conflict abroad has been waging for 30 months, it has resolved itself, to a great extent, into a master duel between ingenuity and ingenuity. The best minds of all the countries embroiled in the encounter are being driven to their utmost to devise new instruments of destruction and of defense.

Lessons from this war have been heeded by the congress of the United States. It is natural that the government called eminent scientists to the colors. They have responded patriotically and will lend their best efforts toward preparing the most deadly and effective explosives, toward developing metallurgy to as nearly perfection as possible, toward applying principles and deductions to military inventions for use under and on the water, under and on the ground and in the air; and toward construction of artillery, bridges, military roads and trenches, *ad infinitum*. They are to do all in their power to place this country in a condition of industrial preparedness that is better than that of any other country.

With a view to marshalling the vast mental and physical resources of the United States, the first session of the sixty-fourth congress enacted some important legislation. It also greatly liberalized appropriations so that what was written into the statutes could be practically applied. The two principal organizations given legal status by congress which represent the underlying principles of industrial preparedness are the naval consulting board and the council of national defense. The former was actually called into being in the summer of 1915 by Secretary of the Navy Josephus Daniels, and was then known as the naval advisory board, but not until the first session of the sixty-fourth congress was it given a legal status and its name changed to the naval consulting board. Congress appropriated $25,000 for expenses incident to its services, which its members had previously rendered gratis. Nevertheless, they are spending money from their own pockets and using their own valuable time purely as a matter of loyalty, and are glad of the chance to do it. It is obvious that the government could not afford to pay salaries to these high grade men that would be anything like commensurate with their services.

In an address of welcome to members of the naval consulting board at Washington on Sept. 19, 1916, the secretary of the navy outlined the purposes for which the board had been organized.

"When war burst upon Europe," said Mr. Daniels, "it was evident that some of the great nations, while ready with dreadnaughts and sea

craft, and while having more or less trained officers and men, lacked what the war has taught is essential; to wit, the utilization of the inventive, engineering and scientific talent, and the ability to readily mobilize the industries of the country for national defense. Trained men were called from munition plants and machine shops to serve in the trenches. It required reverses to teach the folly of putting men skilled in the making of shells to carrying guns, for while there developed a shortage of men, the first crisis came when men lacked the munitions to wage an effective war. These men were soon recalled to the plants and factories where they did more for their country's defense in molding the instruments of war than they could render on the field of battle. The United States has now put in operation a policy that regards men making munitions as enlisted for national defense as truly as the men who follow the colors in the shock of actual conflict. Never again will any country fail to appreciate that the mechanic and the munitionmaker is the man behind the gun.

Members of Board

"But we learned lessons from this great war which we are trying through the naval consulting board to make available. The first was the real need of co-operation, study and research between civilian and naval experts, engineers and scientists. Not a few of the inventions that have been most valuable in naval development came from the brains of civilians. When it seemed wise to issue a S. O. S. call to civilian scientists and engineers to aid in naval preparedness, I naturally turned to America's most distinguished inventor, whose inventive genius is only excelled by his robust patriotism, for aid and counsel. I appealed to Thomas A. Edison to lend his name and advice in creating the organization which today becomes a legalized part of the navy. He responded with a cheerful 'Aye, Aye, sir', and then came the question as to how the other members of the board should be chosen. After consideration, it was decided not only to ask 24 eminent men on the board to enlist for this patriotic task, but to seek to enroll the full membership of a dozen of the leading engineering and scientific societies of the country. I requested a dozen great organizations each to name two members of the board, thus securing the earnest co-operation of all the 36,000 members of these societies and freeing the selection from any suggestion that the composition was in the least influenced by partisan or personal considerations."

The organizations making up the board are the American Electro-Chemical Society, American Society of Aeronautic Engineers, American Society of Civil Engineers, American Institute of Mining Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Mathematical Society, American Aeronautical Society. Inventors' Guild, American Society of Automobile Engineers, and the American Chemical Society.

DANIEL WILLARD,
Chairman, Advisory Commission, Council for National Defense

The board consists of the following members: American Chemical Society, W. R. Whitney and L. H. Baekeland; American Institute of Electrical Engineers, Frank Julian Sprague and Benjamin G. Lamme; American Mathematical Society, Robert Simpson Woodward and Arthur Gordon Webster; American Society of Civil Engineers, Andrew Murray Hunt and Alfred Craven; American Aeronautical Society, Matthew Bacon Sellers and Hudson Maxim; Inventors' Guild, Peter Cooper Hewitt and Thomas Robins; American Society of Automobile Engineers, Howard E. Coffin and Andrew L. Riker; American Institute of Mining Engineers, William Lawrence Saunders and Benjamin Bowditch Thayer; American Electro-Chemical Society, Joseph William Richards and Lawrence Addicks; American Society of Mechanical Engineers, William LeRoy Emmet and Spencer Muller; American Society of Aeronautic Engineers, Bion J. Arnold and Elmer A. Sperry. Miller Reese Hutchinson is aide to Mr. Edison.

Soon after the naval consulting board had been created, a sub-committee was appointed to investigate the industries of the United States with a view to their mobilization. It was called the committee on industrial preparedness, and is represented by the American Society of Civil Engineers, American Institute of Mining Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers and American Chemical Society.

Work Commenced

Howard E. Coffin, vice president and consulting engineer of the Hudson Motor Car Co., one of the most prominent engineers in the country, was made chairman of the committee. Associated with Mr. Coffin is W. S. Gifford, chief statistician of the American Telephone & Telegraph Co., who was made supervising director of the committee's work. The commitee maintains headquarters in New York City and has been working assiduously ever since it was appointed to aid the United States to mobilize its industries, or, as the committee has said, to establish "a sound industrial basis to form the backbone of a real system of national defense".

Mr. Coffin found that there were three initial steps necessary in connection with this gigantic work. The first step was to discover exactly the quantity and nature of munitions that American industry could produce in time of war. The second step was to devise a plan to put the plants of the country quickly into the service of the government when required. The third step was to form an organization of skilled labor that would not break down in time of war and to keep that labor at its regular work instead of going to the front.

Work of making the inventory was begun last April and a preliminary report was made upon it. To effectually make the inventory, Mr. Coffin names 240 state directors, under the guidance of Mr. Gifford. The District of Columbia and the territory of Alaska also are represented. These directors commanded the work of the

members of the societies named, the directors by appointment of the secretary of the navy becoming associate members of the board. Each state committee made up of five members organized as a state board with a chairman. This board mapped out the general lines of the work to be done. The field aides, the men who did the actual collection of much of the data, were assigned to a group of specific establishments to be inventoried. In so far as possible the aide was assigned to establishments with which he was associated. Because the navy and war departments had found it impossible to contribute to the expenses of the work, one of the tasks of each state board was to meet the expenses of carrying on the state work. The work of the state boards was materially assisted by the co-operation of those who operate industrial plants as well as various chambers of commerce, boards of trade and civic and other organizations.

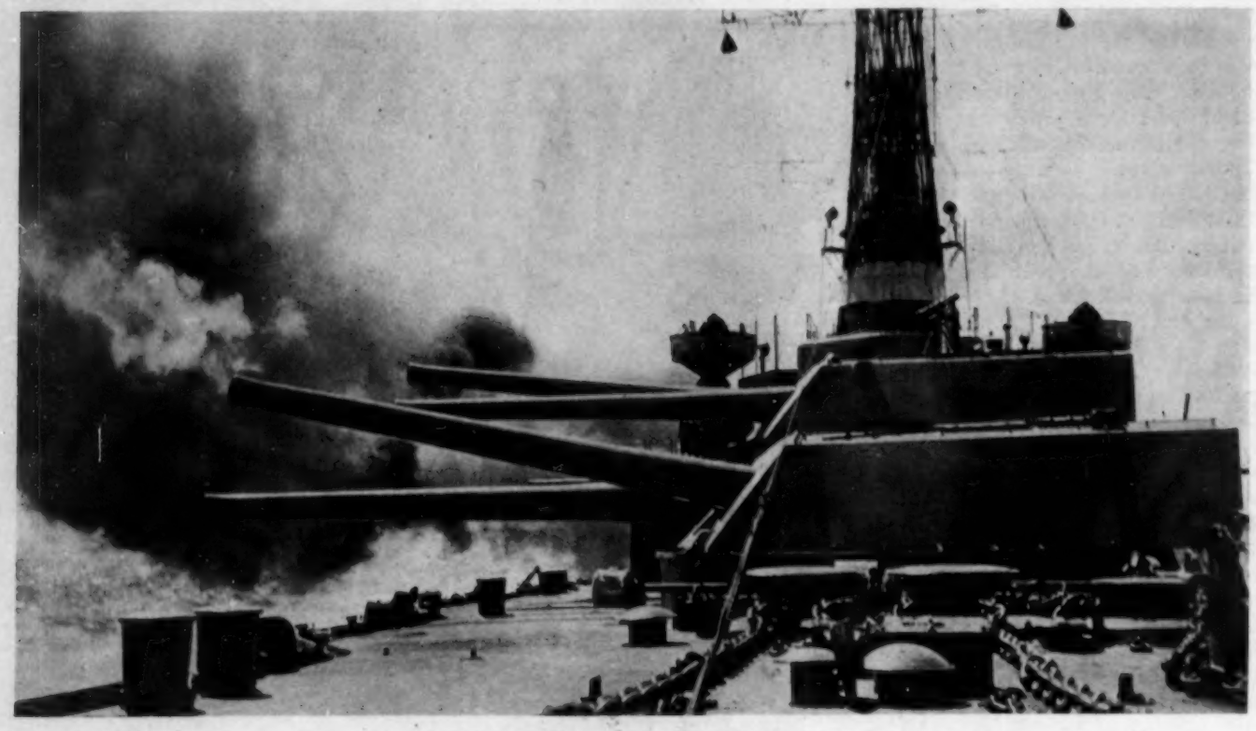
The committee was pleased with what had been done. About 24,000 responses were received to requests for information and 500 more are expected. Necessarily, the information gathered will be held strictly confidential and will be entirely for use of the army and navy authorities. The information asked for in the many thousands of blanks sent out included the following: The estimated value of the physical plant; a description of the plant surroundings, building plans, capacity of each floor, description of fire protection, elevators, facilities for feeding employes, telegraph plants in buildings, pneumatic tube service in plant, raw materials used, products manufactured, branches maintained for distribution, etc., covering the thousand and one details that go to make up business enterprise. In addition, the committee ascertained facts regarding labor and tools employed. Information also was sought as to how many employes were American citizens. Under the heading of "Labor" the employer was asked whether his is a union shop, if labor is easy to obtain, whether there had been any recent troubles at the plant. He was also requested to furnish information as to skilled and unskilled labor, pay and hours of employment and in what departments, if absolutely necessary, women could replace men. Information was also sought regarding transportation facilities.

Serious Questions

On the subject of "Possible Future Arrangements", these questions were asked: "Would you consider bidding upon regular army and navy contracts in time of peace? Would you consider accepting army and navy business in time of war on cost plus reasonable profit basis? Would you consider accepting a minimum annual order for the product for which the plant is best fitted, so as to insure familiarity with the work and for general educational purposes? Would you consider enrolling skilled labor in the industrial reserve?"

Mr. Gifford, commenting on the inventory, said there can be no scheme to build up a munition trust of any sort under the plan of arrangements, for it includes giving to all industrial plants a minimum order for the product for which a plant is best fitted. This is intended not only to familiarize employers with the work, but to also make of each a government agency that can, if war comes, start at once turning out the munitions for the manufacture of which past experience has best fitted it. Mr. Coffin has recommended legislative action by congress giving the navy and war departments authority to place annual orders of $1,000 each for war munitions with manufacturers throughout the country to learn their ability to make munitions in time of war. He has suggested that an order be given to every plant in the United States with a business of more than $100,000 a year.

In his annual report for the fiscal year of 1916, speaking of the work of the naval consulting board, Secretary



PREPAREDNESS MEANS MORE THAN THIS

Without Adequate Industrial Preparedness, Carefully Worked Out in Advance, the Guns Could Not Roar Nor the Ship Maneuver—Embattled Work Shops Spell Victory: The Lack of Them, Defeat

Daniels said that of the problems presented by the navy department for solution, some have been solved and others are in process of investigation, especially where the question involved is one subject to continuous improvement. Reports as to the value of many inventions, he points out, have been received from the naval consulting board, and its work has brought the officials of the navy department into closer touch with many industries. Captain William Strother Smith, one of the ablest and brightest minds associated with the navy department, has been assigned to pass upon proposed inventions. The feeling that suggestions from civilians do not receive due consideration at the hands of naval experts is gradually disappearing because of the better understanding on the part of the civilians of the experts' work. Captain Smith is the type of a man who will assist in making this feeling disappear quickly, for he is ready at all times to give the utmost consideration to all worthy suggestions.

Naval Research Laboratory

In connection with this work, Mr. Edison, as chairman of the naval consulting board, at the request of Secretary Daniels, considered the idea of an experimental and research laboratory. Secretary Daniels recommended to congress that it make provision for such an institution, and as a result an appropriation of $1,500,000 for the laboratory was made. The laboratory will do research work on the subject of gun erosion, torpedo motive power, the gyroscope, submarine guns, protection against submarine, torpedo and mine attack, improvement in submarine attachments, improvement and development in submarine engines, storage batteries and propulsion, improvement in radio installations and such other necessary work for the benefit of the government service. It is designed, through this laboratory also to standardize war materials, so that they can be produced quickly by private and government manufacturing concerns. Through research work at the laboratory it is hoped to develop to the highest pitch of quality and standardization all the materials to be worked upon, so they may be produced by private and government manufacturing plants. Development of war units which have never been the object of adequate specialization will also be one of the great purposes of the laboratory.

The council for national defense, created by the army appropriation act, was also established to co-ordinate industries and resources for the national security and welfare. It is contemplated that this council will eventually take over the work of industrial preparedness now being done by the naval consulting board, and arrange it in such form as to be available to all departments of the government in time of war. This council consists of the secretary of war, secretary of the navy, secretary of the interior, secretary of agriculture, secretary of commerce, and secretary of labor. An advisory commission was nominated by the council and appointed by the President. It consists of seven persons, in accordance with the provision of the act, which says that each member of the commission shall "have special knowledge of some industry, public utility, or the development of some natural resource, or otherwise be specially qualified, in the opinion of the council, for the performance of duties hereinafter provided." Members of the commission serve without compensation, but are allowed actual expenses of travel and subsistence when attending meetings of the commission or engaged in investigations pertaining to its activities.

THE SECRETARY OF THE NAVY AND HIS CONSULTING BOARD
Seated at the Table With Secretary Daniels is Thomas A. Edison, Chairman of the Board

Duties of Council

It is the duty of the council for national defense "to supervise and direct investigations and make recommendations to the President and the heads of executive departments as to the location of railroads with reference to the frontier of the United States so as to render possible expeditious concentration of troops and supplies to points of defense; the coordination of military, industrial and commercial purposes in the location

of extensive highways and branch lines of railroads; the utilization of waterways; the mobilization of military and naval resources for defense; the increase of domestic production of articles and materials essential to the support of armies and of the people during the interruption of foreign commerce; the development of seagoing transportation; data as to amounts, location, method and means of production and availability of military supplies; the giving of information to producers and manufacturers as to the class of supplies needed by the military and other services of the country, the requirements relating thereto, and the creation of relations which will render possible in time of need the immediate concentration and utilization of the resources of the United States."

The work of the advisory commission is provided for by the council, the rules and regulations for the conduct of the work to be approved by the President. The council may organize subordinate bodies for its assistance in special investigations, either by the employment of experts or by the creation of committees of specially qualified persons to serve without compensation, but to direct the investigations of experts so employed. An original appropriation of $200,000 was made for the council and it is probable a similar appropriation will be made at the present session of congress. Reports of the advisory commission and the council are to be submitted to the President, or to heads of executive departments, and, in turn, an annual report shall be made to congress through the President.

Members of the Commission

President Wilson made public on Oct. 11 the names of the seven men whom he has appointed members of the advisory commission. They are engaged in wholly different fields of activity, and it is known that the President had this in mind in naming them. They are: Daniel Willard, Baltimore, president of the Baltimore & Ohio railroad; Samuel Gompers, Washington, president of the American Federation of Labor; Dr. Franklin H. Martin, Chicago; Howard E. Coffin; Bernard Baruch, New York, banker; Dr. Hollis Godfrey, Philadelphia, and Julius Rosenwald, Chicago, president of Sears, Roebuck & Co. Dr. Martin is a distinguished surgeon who was recommended by the Affiliated Medical Societies of the country. Dr. Godfrey is a prominent engineer, who gave up his private practice to assume the duties of president of the Drexel Institute in Philadelphia.

The council of national defense met in the office of Secretary of War Newton D. Baker, on Dec. 6 and organized, the session being attended by the advisory commission. Definite plans of procedure were mapped out at the meeting.

The department of commerce will make a survey of the various industries to be organized by the council and will seek the co-operation of such industries at once. The war and navy departments will likewise endeavor to organize such industries as are in touch with their departments through supplying war material.

Steel Industry Indispensable

The council expects to work out a comprehensive scheme that will enable it to put the industries of the country on a war basis on 24 hours' notice and start a stream of war supplies into the military organization immediately upon a declaration of war. The extremely important part that the steel industry of the United States is going to play in this plan of mobilization cannot be overstated. Its normal annual capacity, approximately 38,000,000 tons, exceeding as it does the combined annual normal capacity of Germany and England, denotes the great possibilities of the steel industry of this country in the way of supplying munitions in time of war.

In this connection attention may be appropriately directed to legislation to equip private plants with gages, dies, jigs, tools, fixtures and other special aids and appliances, including specifications and detailed drawings for the immediate manufacture of arms, ammunition and special equipment for military purposes. In the national defense act calling for these appliances is carried a provision that the existing laws prescribing competition in the procurement of supplies by purchase shall not govern when ever in the opinion of the secretary of war such action will be for the best interest of the public service. The object of this legislation is apparent. The length of time required for fitting even a going manufacturing concern with special tools, etc., to turn out large quantities of such articles as small arms cartridges, for instance, or fuses for field artillery ammunition, is generally known. It has been conservatively estimated by Brig. Gen. William Crozier, chief of ordnance, war department, that a plant well equipped for the manufacture of a military rifle of a given model would require something like eight or nine months to supply itself with these special fixtures, etc., in sufficient quantity to enable it to turn out a rifle of a different model in some such reasonable number as 1,000 a day. Further latitude is given to the government in the proviso that in the expenditures of appropriations for carrying out this legislation such selection may be exercised, irrespective of competition, as, in the opinion of the secretary of war, will be for the best interest of the public service.

In the fortifications act, passed at the same session of congress as the national defense act referred to, an appropriation of $1,000,000 is made to procure special tools. It is provided that not exceeding 25 per cent of that sum may be used in obtaining such material as may be desired from private plants. Further provision is made that not exceeding $50,000 worth of such material may be purchased from any one person or company, and in making such expenditures the laws prescribing competition in the procurement of supplies by purchase shall not govern. In the army appropriation act, $10,000,000 is allowed principally for small arms ammunition. It is accompanied by the proviso that not more than $5,000,000 of this sum may be used in the purchase of ammunition. This permits of making purchases in sufficient quantities to give considerable encouragement to private manufacturers. In addition, it is further provided that $250,000 of the appropriation may be used in equipping private plants with special tools, etc., and that $50,000 worth of orders may be given to individual private manufacturers, in furtherance of their preparation to meet the government's emergency needs, by war department selection, instead of by competition. Most of the items of appropriation for munitions, in the army appropriation act, are accompanied by similar restrictions, and, in the opinion of General Crozier, in some instances they are likely to be less encouraging than those just mentioned. But the fact remains that the appropriations made and the general scheme of the legislation show a great improvement over previous legislation.

Acid Test Applied

It is obvious that congress took some backward steps in its preparedness program, but they are in a small minority when compared with the forward steps. At the same time, however, it is evident that congress has much further to go to bring about real industrial preparedness, but it has provided the executive departments with the extremely important

tools to dig to the bottom of the question and work out a thorough scheme of such preparation. No longer are the American people going to be deluded into false security based upon the possibilities of the much talked of Yankee ingenuity. They are going to know precisely what constitutes that ingenuity, its shortcomings and its strong points. The proverbial acid test is being applied.

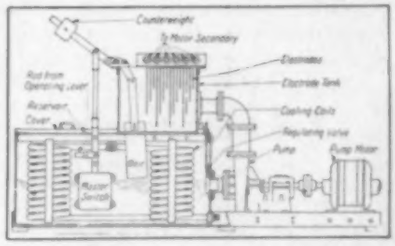
Co-ordinated Research

Among the important quasi-official organizations which are taking up the matter of industrial preparedness is the National Research Council, appointed by the National Academy of Sciences, at the request of President Wilson to co-ordinate the scientific research of the United States. This council has been assured of ample funds to proceed with plans for putting the United States in the lead of all nations in the application of science to industry or warfare. Funds of the Engineering Foundation, a heavily endowed organization of the four principal engineering societies of the United States, have been placed at the disposal of the council. Dr. George Ellery Hale, chairman of the council, and Dr. William H. Welch, president of the National Academy of Sciences, returned several months ago from a visit to England and France to learn at first hand what has been the recent organization of scientific resources in those countries. They have said they believe there is prospect for cultivation of an altogether new relation between science and industry in the United States.

Members of the council include leaders in all branches of science. Dr. Hale is director of the Mt. Wilson Solar Observatory. Medicine, for example, is represented by Dr. Welch; by Maj. Gen. William C. Gorgas, surgeon general of the United States army; Dr. Simon Flexner, director of the Rockefeller Medical Institute, and Dr. Victor C. Vaughan, past president of the American Medical Society; biological science by Dr. Edwin G. Conklin, professor of zoology, Princeton university; chemistry, by Dr. A. A. Noyes, of Massachusetts Institute of Technology, and Dr. L. H. Baekeland; physics, by Dr. A. A. Michelson, of the University of Chicago, and electricity by Prof. M. I. Pupin, of Columbia university.

These branches, with the exception of medicine, are in the realm of pure science. Recognizing, however, that the practical application of the principles which the pure scientists discover rest largely with the engineers, there is a strong representation from the great engineering societies. Clemens Herschel, president of the American Society of Civil Engineers; John J. Carty, chief engineer of the American Telephone & Telegraph Co.; Gano Dunn, president of the J. G. White Engineering Corporation; C. E. Skinner, director of the research laboratory of the Westinghouse Electric & Mfg. Co., and Dr. W. R. Whitney, director of the research laboratory of the General Electric Co., are among those who will represent the engineering side of the council's work.

The important military aspects will be presented to the council by Brig. Gen. Crozier, of the war department, and Chief Constructor David W. Taylor and Engineer-in-Chief R. S. Griffin, of the navy department. Other branches of the government are represented by Dr. S. W. Stratton, director of the bureau of standards; Van H. Manning, director of the



LIQUID TYPE CONTROLER

bureau of mines, and Prof. Charles F. Marvin, chief or the United States weather bureau.

Other members of the council are Dr. John A. Brashear, Pittsburgh; Dr. W. F. M. Goss, dean of engineering, University of Illinois; Dr. William H. Holmes, curator United States National Museum; Dr. W. W. Keen, president of the American Philosophical Society; Prof. E. C. Pickering, director of the Harvard college observatory; Charles F. Rand, president, United Engineering Society; Prof. Theodore W. Richards, Harvard University; Professor Millikin, University of Chicago; Ambrose Swasey, Cleveland; Dr. Elihu Thomson, Swampscott, Mass.; Dr. C. R. Van Hise, president of the American Association for the Advancement of Science; Dr. Charles D. Walcott, secretary of the Smithsonian Institute, and Dr. John M. Coulter, professor of botany, Princeton university.

Special Committees at Work

The council has already organized a number of special committees which will inquire into (1) the preparation of a national inventory for research; (2) suggestions of certain important research problems for solution; (3) the promotion of close co-operation; (4) co-operation and support of educational institutions; (5) co-operation with research foundations; (6) encouragement in co-operating laboratories of research, designed to strengthen the national defense and to make the country independent of foreign supplies of nitric acid and all other military requirements.

Munitions To Be Studied

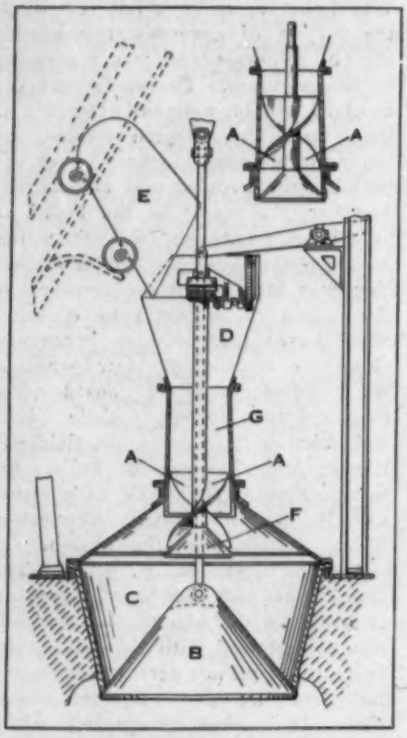
Another activity has been taken up by a board of army officers and civilians under Col. Francis J. Kernan, of the Twenty-eighth Infantry. The board was selected by Secretary of War Baker to make a full review of the subject of government construction of all arms and war munitions for its own use. The study was authorized by the national defense act, but is generally accepted as being an impracticable step in the way of industrial preparedness. It is believed, however, the report of the board, if at all comprehensive, will show the absurd phase of the project. This section was inserted in the measure at the behest of members of congress who have continuously harangued about the so-called "private profit in war". Members of the board other than Colonel Kernan, include Lieut. Col. Charles P. Summerall, field artillery; Maj. Lawson M. Fuller, retired; Benedict Crowell, Cleveland, and R. Goodwin Rhett, Charleston, S. C., president of the chamber of commerce of the United States. The board was authorized to report to congress by the first of the year. It was not selected until November, and evidently could not perform the heavy task devolving upon it in a few weeks' time. It is also questionable if industries throughout the country would be willing to permit it to gather the data desired for the special purpose in view.

Liquid Rheostats for Motors

The extensive use of electric motor drive for mine haulages, hoists, dredges and similar applications, has created a demand for a controler for large wound-rotor induction motors which would allow wide and accurate speed variation, positive time-limit acceleration, and which would allow the motor to run at reduced speeds for long periods. The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has designed a liquid type of control apparatus which is said to meet these conditions satisfactorily. These controlers which are shown in an accompanying

illustration, have been in operation in various application for four years and are said to have proved equal to the most severe requirements.

In the type of control shown, the depth of the liquid in which the electrodes are immersed is varied. This principle insures smooth acceleration and close speed regulations of the motor as an infinite number of steps may be obtained by gradually varying the depth of the liquid. This scheme is designed to eliminate objectionable jerks and sudden strains in both the cable and equipment when starting loads of large inertia. The maintenance costs are said to be low, because the



FURNACE CHARGING DEVICE

electrodes are practically the only parts subject to wear. This rheostat is of especial value for heavy-duty reversing service where starting is frequent and where the motor is run at reduced speeds.

As shown by the diagram, the three secondary phases of the motor are each connected to a set of electrodes suspended in the electrode tank. The operating lever is attached to an arm just above the master switch. When the lever is in the "off" position, the electrolyte, which is a solution of sodium carbonate (sal soda) is at its lowest level. When the operating lever is moved from the "off" position, the contactors in the primary circuit are operated by the master switch and the weir is raised. The electrolyte, which is circulated continuously by the pump, rises as the weir is raised. This immerses the electrodes more, decreases the resistance in the rotor circuit, and speeds up the motor. Thus by adjusting the position of the weir the resistance in the rotor circuit is changed and the speed of the motor regulated.

A regulating valve in the pump discharge or intake pipe prevents the liquid from rising in the electrode tank at a rate greater than that for which the valve is adjusted. The lever may be moved directly to the "full on" position while the liquid will raise at the rate determined by the valve setting. The weir, however, is of such a size and design that the electrolyte will flow through to the lower compartment speedily enough to take care of plugging when that is practiced.

To prevent overtravel in hoist work, either single or double pole hatchway limit switches can be furnished. When the hoists are used for lowering, an overspeed device is desirable. Cam limit switches form another means of protection, safeguarding against accidents due to carelessness on the part of the operator.

Furnace Charging Mechanism

A mechanism for effecting better distribution of ore, coke and limestone in blast furnaces has been patented by Alfred C. Nelson, Cleveland, engineer for the William B. Pollock Co., Youngstown, O. The distribution is accomplished by means of the blades shown at *A* in the accompanying illustration.

The device is used in connection with the customary equipment of furnace bell, *B*; main hopper, *C*; receiving hopper, *D*; skip, *E*; and *F*, upper bell. The stock dumped from the skip passes through the receiving hopper and the cylinder, *G*, and is divided by the distributing blades, *A*, into as many paths as there are blades. The charge will thus be deposited at the same number of points in the main hopper as there are blades. By rotating the distributor, the next charge may be dumped between the points where the preceding one was deposited. After observing the amount of rotation necessary for the best distribution, the rotating mechanism may be adjusted to operate automatically.

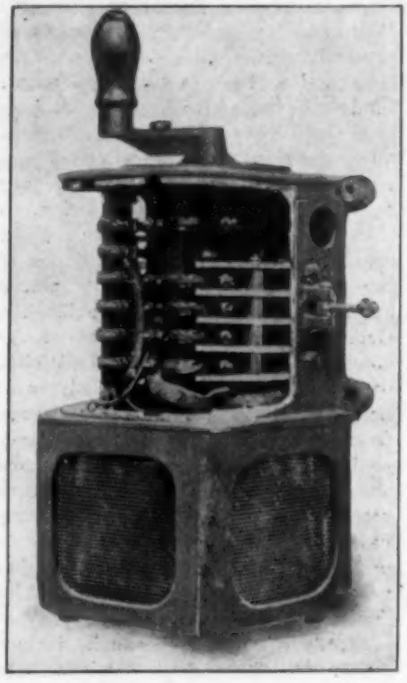
Mr. Nelson claims that his invention permits an improved control over the distribution of stock in the main hopper, and thus in the furnace.

The importance of proper control over the distribution of the stock is clearly understood. The charge being of different grades of coarseness, the most satisfactory distribution is found when the lumps are in the center of the furnace and the fines next to the walls. This arrangement permits an unobstructed draft and prevents uneven wear on the furnace lining.

New Motor Controler

The accompanying illustration shows a new compact type of drum controler with the cover removed. It is made in standard sizes of 1 to 25 horsepower for use in connection with any type of machine tool. These controlers provide speed regulation by inserting resistance in the shunt field circuit, the armature resistance being designed for starting duty only. The maximum speed range that can be provided is 3:1.

The armature contact fingers and



COMPACT DRUM CONTROLER

segments are of solid copper, easily renewable, and are so arranged that dynamic braking is provided when the drum is returned to the off position. The field regulating unit consists of a field resistance commutator mounted on the drum shaft and the necessary field resistance in the form of ferrule type units located in a ventilated case at the end of the drum. They are connected to the commutator through contact clips at each end, thus eliminating all lead wires.

Gear or sprocket drive may easily be employed in place of the handle to bring the control to a convenient point as, for instance, the apron of a lathe. Protective panels when furnished are mounted upon the frame containing the armature starting resistance. This controler is made by the Cutler-Hammer Mfg. Co., Milwaukee.

Modern Hot Blast Stove Design–I

The Modern Stove is a Development of the Last Five Years—Changes in Furnace Design and Fuel Used Have Made the Use of Increased Blast Temperatures Desirable

BY ARTHUR J. BOYNTON

FURNACE operators are today confronted with a problem in connection with the use of hot blast very similar to that which engaged the attention of the iron masters of England and Scotland in the years when the blast was heated in stoves fired by solid fuel. The fuel so used had to be added to that charged into the furnace, and remained a debit against the advantage gained by the use of hot blast. Even under these conditions the early records tell of a net saving of 1,000 pounds of coal per ton of iron and from that day to this not only the economy but the practical necessity of hot blast excepting for charcoal practice, has not been seriously questioned.

After the advent of the closed top, which permitted the use of furnace gas in the stoves, and up to the recent period of electrification of steel works and mills, the hot blast saving, in terms of fuel charged in the furnace, was all saving. The gas supply was normally abundant for all the furnace plant uses, the temperature of blast which could then be used was generally not high, and the subject of stove design attracted comparatively little attention.

During the past five years changes chiefly in furnace lines and furnace fuel have made the use of increased blast temperatures extremely advantageous from the standpoint of coke practice, while the demand for gas for power purposes has again required that extreme economy be practiced in the use of fuel in stoves. There has been no general arguments as to the advisability of limiting hot blast temperatures for the sake of making the gas available for power purposes, but rather a disposition to make use of the highest temperatures with which it is possible for the furnace to work, and to increase the size of the stove equipment, primarily for this purpose, but also with a careful regard for economy in the use of gas. Under the existing conditions it has been possible in many cases, not only to increase the blast temperatures 300 or 400 degrees with no additional gas consumption, but actually to produce these higher temperatures with less gas than that formerly required for the moderate temperatures then in use.

It is the purpose of this paper to give an account of the generally accepted principles of recent stove construction and to describe and compare some recently built stove installations.

The modern stove is a development of the last five years. The standard equipment of 1910 was a set of four stoves, built with 9-inch checker openings and 3-inch walls, or larger openings and thicker walls where radial checkers were used, containing an average heating surface of about 175,000 square feet for furnaces 21 feet 6 inches in the bosh and larger, with a range of from 150,000 to 250,000 square feet.

A considerable part of this surface was ordinarily ineffective on account of plugged checkers and cinder burnt onto the bricks. The combustion of the gas was haphazard, chiefly because the burner which gave some possibility of control gave also a flame temperature which filled the combustion chamber and the tops of the checkers with cinder. The gas was, therefore, purposely burned in a long flame and its temperature kept consistently moderated.

The first installment of the paper, "Progress in Hot-Blast Stove Design," presented at the recent St. Louis meeting of the American Iron and Steel Institute. The subject matter of the original paper has been revised by the author, who is superintendent of blast furnaces, National Tube Co., Lorain, O.

Percentages of Free Area and Other Comparative Ratios for Square Checkers of Various Sizes

DIAMETERS OF SQUARE CHECKER OPENINGS, INCHES.

	Thickness of walls, in inches	1	1⅛	2	2½	3	3½	4	4½	5	5½	6
Sq. ft. surface per cu. ft. space		12.000	11.520	10.667	9.796	9.000	8.296	7.680	7.141	6.667	6.248	5.878
Cu. ft. brick per cu. ft. space	1	0.750	0.640	0.556	0.490	0.438	0.395	0.360	0.331	0.306	0.284	0.265
Sq. ft. surface per cu. ft. brick		16.000	18.000	19.185	19.992	20.548	21.003	21.333	21.574	21.788	22.000	22.181
Percentage of free area		25.000	36.000	44.440	51.020	56.250	60.490	64.000	66.940	69.440	71.600	73.47
Sq. ft. surface per cu. ft. space		7.680	8.000	7.431	7.507	7.142	6.717	6.347	6.000	5.680	5.388	5.120
Cu. ft. brick per cu. ft. space	1½	0.840	0.750	0.638	0.610	0.556	0.510	0.471	0.438	0.408	0.383	0.360
Sq. ft. surface per cu. ft. brick		9.143	10.667	11.647	12.306	12.845	13.171	13.476	13.699	13.922	14.068	14.222
Percentage of free area		16.000	25.000	32.650	39.060	44.440	49.000	52.890	56.250	59.170	61.730	64.000
Sq. ft. surface per cu. ft. space		5.333	5.877	6.000	5.926	5.760	5.553	5.333	5.112	4.898	4.693	4.500
Cu. ft. brick per cu. ft. space	2	0.888	0.816	0.750	0.691	0.640	5.595	0.556	0.521	0.490	0.462	0.438
Sq. ft. surface per cu. ft. brick		6.006	7.202	8.000	8.576	9.000	9.333	9.592	9.812	10.000	10.158	10.274
Percentage of free area		11.110	18.360	25.000	30.860	36.000	40.490	44.440	47.930	51.020	53.780	56.250
Sq. ft. surface per cu. ft. space		3.918	4.500	4.741	4.800	4.760	4.667	4.544	4.408	4.267	4.125	3.986
Cu. ft. brick per cu. ft. space	2½	0.918	0.859	0.803	0.750	0.702	0.660	0.621	0.587	0.556	0.527	0.502
Sq. ft. surface per cu. ft. brick		4.268	5.239	5.904	6.400	6.781	7.071	7.317	7.509	7.674	7.827	7.940
Percentage of free area		8.160	14.060	19.750	25.000	29.750	3.403	39.870	41.330	44.440	47.260	49.830
Sq. ft. surface per cu. ft. space		3.000	3.555	3.840	3.967	4.000	3.976	3.918	3.840	3.750	3.654	3.556
Cu. ft. brick per cu. ft. space	3	0.937	0.889	0.840	0.777	0.750	0.710	0.674	0.640	0.609	0.581	0.556
Sq. ft. surface per cu. ft. brick		3.202	4.000	4.571	5.106	5.333	5.600	5.813	6.000	6.158	6.289	6.396
Percentage of free area		6.250	11.110	16.000	30.560	25.000	28.990	32.650	36.000	39.060	41.870	44.440

Under these conditions few stoves developed over 1,000 degrees of blast temperature, and those which exceeded this temperature did so at the expense of stack gases, in some cases hotter than the blast. The efficiency of such stoves was considerably below 50 per cent.

In addition to low blast temperatures and the wasteful use of fuel in stoves the conditions referred to were most unsatisfactory from the standpoint of regular furnace practice. With a furnace that could profitably use all the heat which such a set of stoves could transmit to the blast, the operator was continually effecting an equilibrium between burden and blast temperatures as stoves came off for cleaning and went into service again, while lack of surplus heat to correct irregularities showed in off iron, and occasionally decreased tonnage. Not the least difficulty was the necessity of working men inside the stoves under conditions which were exhausting and unhealthful.

The development which is rapidly changing these conditions was made possible by the introduction of washed gas. Without this improvement the only change which could be made was an increase in the size, that is, in the outside dimensions of the stoves, or in the number of stoves per furnace. All arguments as to the desirability of such developments have been cut off by the evidently much more advantageous arrangement possible with clean gas, which, in the case of existing plants, reduced stove improvement to a relining proposition.

The primary requirement of hot blast stoves is rapidity of heat transfer between the gas or air and the brick, since upon this rate of heat exchange depends the size of the stove installation.

During the cooling phase of operation the stove must heat a given quantity of air per unit of time to a definite temperature. When this is no longer possible the cooling phase should end. The rapidity with which the heat can be disengaged from the brick is therefore the measure of the amount of effective brickwork necessary for a certain duration of the cooling phase, or in other words, with any given construction, a measure of the size of the stove. The necessary number of stoves depends upon the relation between the time required to heat and that required to cool, or upon the practicable rate of heating. Since the transfer of heat takes place by conduction, and since the conductivity of heat through fire brick is very slow, it is of primary importance to place the average mass of the fire brick as close to a heating surface as possible. This means practically, that the checker wall should be as thin as structural strength will permit. With any given thickness of checker wall a decrease in the diameter of the checker opening gives additional brick within a given space, and also an increase in the heating surface.

The relations with regard to heating surface, volume of brick, and percentages of free area for square checkers of various sizes are shown in the accompanying table.

From this table it appears that the greatest possible heating surface and volume of brick are obtained with the thinnest possible wall, and a diameter of checker opening equal to the thickness of the bricks. It is also apparent that with a checker diameter of 3½ inches and a thickness of wall of 2 inches, there is an increase in the volume of brick within a given space of 35.8 per cent and an increase of heating surface of 85.1 per cent as compared with the standard 9-inch openings and 3-inch walls. These dimensions have been applied to stoves in successful use today, and represent the advantage gained up to the present time by the use of washed gas.

The accepted practice is that the checker openings should be as small and the walls as thin as possible. For two-pass stoves, the choice is now practically confined to 2-inch or 2½-inch brick, and to diameters of openings from 3½ inches to 5½ inches, each designer going as far as his conservatism will permit. With these small checkers, the relatively great effect on the area of the openings of a slight movement of the brick, due to expansion and contraction, is the determining factor in deciding the limits of the construction.

The common practice is to state the size of a stove in terms of its heating surface. Within the present limits of construction the question of sufficient volume of brick for a given surface is not a practical one, hence the heating surface is a rough measure of the possible rate of heat exchange and therefore a proper measure of the size of the stove. Moreover, the rate of heat transfer is also dependent upon the motion of the gas or air stream within itself. A stationary body of gas within a checker, once the gas next the brick is cooled to the temperature of the brick can only impart further heat to the brick by conduction through its own mass. This will evidently give a much slower rate of transfer than will be the case if a continuous current of hot gas comes in contact with the brick work. Any rate of flow brings the gas next to the brick continuously in contact with cooler surfaces, but the flow may be so slow or the checker opening so large that the gas passes through the checker somewhat as though it were a solid body with relatively little motion of the gas particles among themselves. This brings about in some degree the slow rate of heat transfer just described. The ideal condition would be that every particle of gas in the checker should come in contact with the brick at each level in the checker, or, in other words that all the gas should

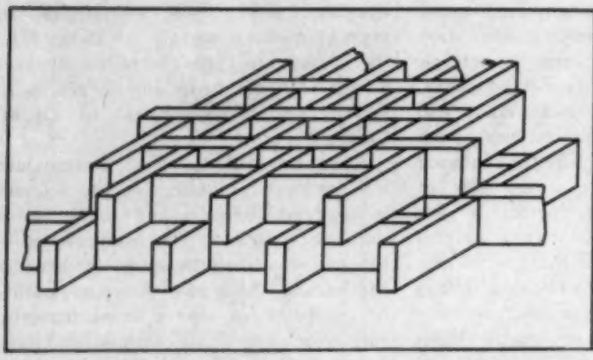


FIG. 1—STANDARD METHOD OF BONDING SQUARE CHECKERS

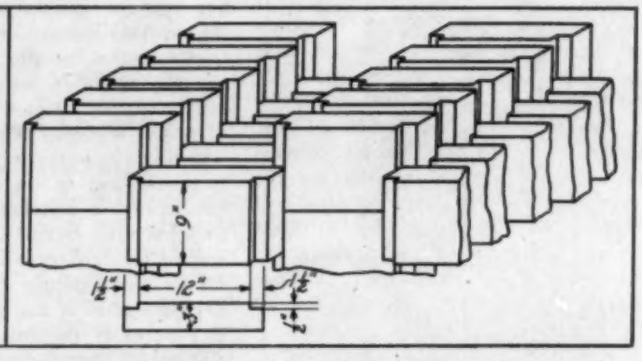


FIG. 2—CHECKER BRICK AND METHOD OF LAYING PROPOSED BY JULIAN KENNEDY

come in contact with all the brick. This condition is manifestly impossible, but the closest possible approximation to it will lead to the best heat transfer, and the determination of the practicable limit is an important matter upon which so far very little action has been taken.

This principle lay at the bottom of the so-called Pfoser-Strack-Strumm system of burning gas, which consisted in practically doubling the consumption of gas in the stoves, and reducing their number, with no increase in stack temperature. Experiments upon our already hard driven American stoves of the old type showed the possibility of increasing the rate of heat transfers, but at a very marked loss in efficiency. It seems probable, however, that a proper size of pass and ratio of length to size will permit a considerable increase in the heat exchange of the stove with but little loss of efficiency.

The progress of recent stove construction has been attended by some changes which have tended to increase the movement of the gas or air upon itself, although these changes have been generally incidental to an increase in heating surface rather than the result of deliberate design. The increase in surface has increased friction, and the lessening in area of the checker pass, due to making the checker diameter more nearly equal to the thickness of the brick, has increased the velocity through the checkers, and added still further to the friction. The reduction in the size of the checkers, which reduced the inner motion necessary to bring the gas in contact with the brick may very probably be a still further aid to heat transfer. The generally accepted laws of fluid friction state that friction is proportional to the surface, and increases with the velocity, but at a more rapid rate than the increase in velocity. It would seem, therefore, that all the recent changes in the direction of smaller checkers, have promoted heat transfer in some degree, aside from the increase in heating surface attendant upon their use. There is as yet, however, no tendency to complicate stove construction with the definite object of promoting inner motion of the gas or air.

Checker Construction

Some of the details of checker construction have necessarily been considered in the above general discussion. The square checkers referred to are practically always used for two-pass side combustion stoves. The usual method of bonding these checkers is shown in Fig. 1. The radial checker has been applied to some recent stove construction but is less economical of space than the square checker on account of the impossibility of maintaining the minimum practicable opening.

The corrugated checker has been applied to some recent construction. This arrangement corrugates the brick running in one direction in an otherwise square or rectangular construction the proportions of which may be varied. As applied to a recently built installation this construction is shown in Fig. 3. Built to these dimensions the relations of surface, free area and brick in unit volume are as follows:

	Straight wall.	Corrugated wall.
Sq. ft. surface per cu. ft. space	3.5	3.906
Cu. ft. brick per cu. ft. space..	0.531	0.594
Sq. ft. surface per cu. ft. brick.	6.59	6.58
Percentage of free area.....	46.88	40.63

The increase in heating surface due to the corrugations as compared with rectangular construction of the same dimensions is 11.6 per cent. The square feet of heating surface per unit of space correspond closely to that obtained with 3-inch walls and 4-inch openings or with 2½-inch walls and 6-inch openings.

These three forms of checkers, square, radial and corrugated, are the ones usually employed, with the square checkers in use in the great majority of cases, and apparently gaining in favor.

A checker which has been proposed by Julian Kennedy, but not as yet installed, is shown in Fig. 2.

The relations for surface, area and volume are as follows:

Sq. ft. heating surface per cu. ft. space	4.977
Cu. ft. brick per cu. ft. space.....	0.644
Sq. ft. heating surface per cu. ft. brick	7.728
Percentage of free area.....	0.356

The square feet of heating surface per unit of space with this construction correspond closely to that obtained with 2-inch walls and 4½-inch openings.

An expedient for increasing the heating surface in stoves having 3-inch x 9-inch square checkers has recently been successfully tried at the Lorain works of the National Tube Co. This consisted in placing inside the existing checker openings pointed tile extending diagonally. These tiles were lowered from the top, the first resting at the ends on the bearing tile at the bottom, so that when the job was completed three-cornered checker openings resulted, the increase in heating surface being about 40 per cent. It is probable, however, that few of the older installations are in condition to permit the successful use of this device.

The remarkable series of stove tests made by A. E. Maccoun and described in his paper on "Blast Furnace Advancement", read before the American Iron and Steel Institute in May, 1915, indicate a distribution of gas and of

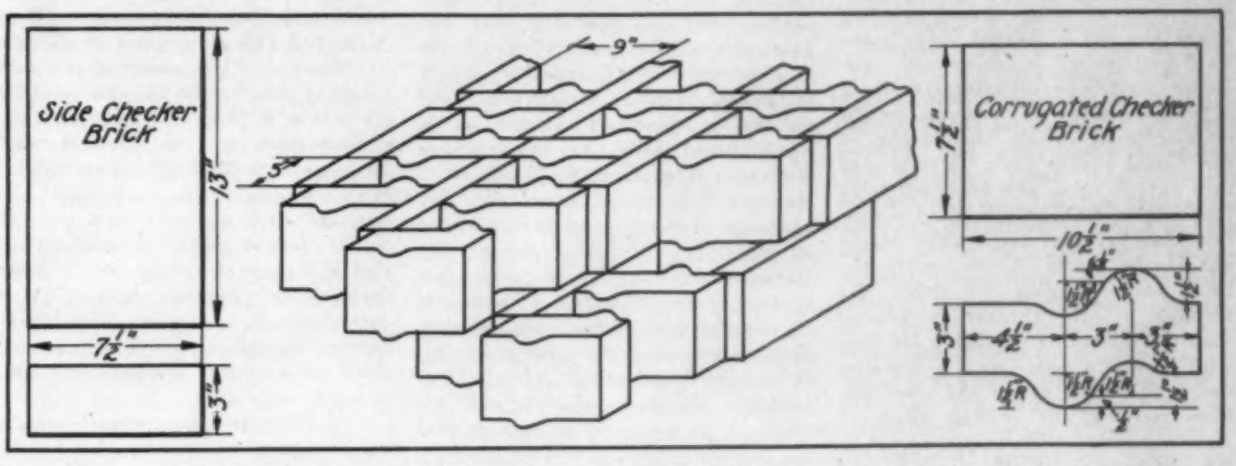


FIG. 3—CORRUGATED AND SIDE CHECKER BRICK AND METHOD OF LAYING AS USED AT JOLIET WORKS OF THE ILLINOIS STEEL CO., JOLIET, ILL.

air in the checkers of a two-pass stove which is far from correct. The inequalities which he found were apparently due chiefly to a lack of symmetry in the top and bottom of the stove. While these tests attracted much interest and showed the fallacy of considering the distribution correct on account of an apparently even temperature at the top of the stove, they have not led to any marked change in the design of two-pass stoves, on account of the mechanical difficulties involved. They show, however, the possibility of great improvement by a construction which will equalize the flow of air and gas throughout a stove.

Frictional resistance in the checkers themselves is probably the most effective aid to this distribution. In addition to this force, according to the generally accepted idea, the buoyancy of the gas and air in the checker exercises an equalizing effect where the gas is heated in a downward and the air in an upward pass. Under conditions of natural draft in a two-pass stove we have the weight of a column of air the height of the stack plus the weight of the gas in the checkers opposing the weight of the gas in the combustion chamber plus the weight of the gas in the stack. Consequently the total force tending to drive gas through a cold checker is greater than that operating through a hot one, with a resultant tendency to equalize the temperature of all the checkers. Conversely in the cooling phase of stove operation, the weight of air in the checkers resists the force of the blast. The hotter the air in any given checker, the less this resistance, and the greater the quantity of air which will be forced through it, the tendency being again to equal the temperature in the various checkers. Where the checkers are heated by an upward current and cooled by a downward flow the hot checker tends to become hotter and the cold one colder.

(*To be continued next week*)

The Thomson Spot Welding Co., Lynn, Mass., which has been recently formed under the Massachusetts laws, has acquired all of the patents for the process of spot welding, and spot welding machines formerly held by the Thomson Electric Welding Co. and the Universal Electric Welding Co. It has also acquired all the physical assets and all the spot welding patents, etc., of the Toledo Electric Welder Co., of Cincinnati, which is being liquidated. The butt welding machine business formerly conducted by this company, has been taken over by the Thomson Electric Welding Co., Lynn, Mass., which will manufacture these machines and look after the needs of the Toledo Electric Welder Co.'s customers.

Coke By-Products

Heavy Demand for Benzol for Non-Military Purposes

New York, Jan. 9.—Pure benzol for non-military purposes has continued in heavy demand by domestic manufacturers and trade authorities now estimate that only about 12 to 15 per cent of the present year's production is unplaced. Prices are holding very firm and leading sellers are looking for advances. Sellers still will accept 55 cents on sizeable quantities. Toluol is scarce and virtually all offerings are from plants which are selling only for peace purposes. Even this non-war product is sold up largely for the current year. One buyer asking 6,000 gallons found only one plant able to take this business. There is little spot toluol available and it is stated even a carload of 3,000 gallons for immediate shipment could not be found easily. Prices are strong with spot from $2 to $2.25. Most of the requirements of toluol for war purposes seem to have been satisfied by the heavy purchasing recently for Canadian account. The phenol market is quiet since production is well sold up and the demand has been satisfied. Some odd lots of spot are available. Prices are unchanged. In solvent naphtha, abundant supplies still are offered with a limited demand, so that the market remains weak.

Sulphate of ammonia supplies for delivery up to June are so small that sellers are able practically to obtain their own prices, as the demand for nearby is active. This week the market is higher at from $4.10 to $4.12, per 100 pounds, at tidewater. Consumers who bought liberally months back are reselling some supplies at a good profit. Complete prices may be found on page 176a.

Prepares to Expand

The W. & S. Mfg. Co., Worcester, Mass., manufacturer of metal stampings, in order to facilitate its further expansion, has incorporated under the name of the Worcester Stamped Metal Co., with a capital stock of $150,000. The W. & S. Mfg. Co. was the outgrowth of the old firm of Wilson & Smith, of which H. R. Sinclair became sole owner in 1910. The new company has elected the following officers: Harry R. Sinclair, president; Frank E. Billings, treasurer, and B. M. Whittle, clerk. In the past, the company has specialized in stamped parts for automobiles and motorcycles, as well as stamped specialties of all kinds. The new company will add to its equipment and go into heavier work, although much of the work done in the past would be classed as heavy stampings. During the past year, the company has devoted its attention to building up a general stamping business, rather than to fitting up for munition work.

Crane Company

Being Organized by Men Who Purchased Prescott Plant

Milwaukee, Jan. 8. — A new electric crane and hoist manufacturing concern is being organized in Milwaukee by a group of former officials and engineers of another company making cranes and hoists, who have purchased the former plant of the Fred M. Prescott Steam Pump Co., at Sixty-fourth and National avenues, in West Allis, and expect to start production by March 1. The name of the new company will be the Milwaukee Electric Crane & Mfg. Co., and the initial capitalization will be $300,000, with an issue of $700,000 contemplated later. Among the men who are backing the new company are: S. H. Squier, former secretary of the Pawling & Harnischfeger Co.; M. A. Beck, former chief engineer; Arthur Mayer, former chief estimator; Leo Mayer, former designer, and Arthur A. Fritsch, until now sales engineer for the company.

The Prescott plant, recently placed on the open market by the present owner, the Worthington Pump & Machinery Corporation, consists of a main shop, 80 x 325 feet, with a side bay, 80 x 285 feet; foundry, 80 x 280 feet; pattern shop, 80 x 80 feet; pattern storehouse, 60 x 80 feet, four-story; blacksmith shop, 40 x 60 feet, and a two-story office building, 40 x 60 feet. It is fully equipped for the manufacture of steam pumps, and but few changes will have to be made although considerable new tool equipment will be installed. Contracts for these already have been placed and delivery guaranteed for the latter part of February. The product will consist of a line of electric traveling cranes, hand cranes and hoists.

The plant is situated on a 7½-acre tract, served by the North-Western and Milwaukee roads and is only a short distance from the Allis-Chalmers Mfg. Co.

The stockholders of the new company will meet about Jan. 20 to perfect the organization. Articles will be filed Jan. 15. Plans provide for an ultimate issue of $300,000 preferred and $700,000 common stock.

Business News of Nation's Capital

Proposed Rates and Rules in Ore Shipments Vigorously Opposed—Chairman Hurley Resigns From Federal Trade Commission—English Concern Underbids Americans

Bureau of *The Iron Trade Review*,
708 Metropolitan Bank Bldg.,
Washington, Jan. 9, 1917.

THAT the establishment of new rates, rules and regulations governing the transportation of iron ore from Lake Erie ports may be far off was indicated last Thursday when the question was discussed before Commissioners Harlan and Daniels, of the interstate commerce commission. The tentative tariffs filed by the railroads proposing new rates and rules, which they say are in accord with the commission's recent ruling in the case, were the object of severe criticism by representatives of the blast furnace interests affected, which include those situated in Ohio, western Pennsylvania, West Virginia and Ashland, Ky. Hardly one of the numerous readjustments contemplated by the commission escaped attacks, and, moreover, the proposed tariffs were given only lukewarm support by the railroad representatives themselves. The effect of the attitude taken by both the shipping and railroad interests was to pass on to the commission full responsibility for the proposed changes.

While the discussion was confined to one day, it was by no means threshed out satisfactorily, and, after having had the question before it in the form of single complaints and otherwise for almost four years, it is thought by some of those interested in the case that it will never be settled until it has been taken to court. Not only was the suggested readjustment of rates assailed by shippers' attorneys as being unlawful, but it was also vigorously maintained that the proposals to let the railroad assess charges for spotting cars of ore at furnace trestles and to withdraw allowances to industrial roads for delivering ore to unloading points was illegal. The tentative tariffs carry the provision as to spotting charges, while it was announced by the carriers' attorneys at the hearing that they intend to file additional tariffs taking away from industrial railroads allowances now granted them for taking cars from the trunk lines and placing them at the points of unloading. It was contended by the railroads that such withdrawal tariffs are necessary in order to equalize conditions by charging furnace interests without industrial lines for the spotting service and not making allowances to those having such lines.

The proposed charges at the dock, 6c per ton on direct ore, for handling from the rail of the vessel to the car, and 26c per ton on indirect ore, for the storing and subsequent loading into cars, were also criticised as being excessive. The argument was further made by shippers' representatives that the plan to divide the transportation service into different parts and to charge for each was entirely new to this country and was unsound. It resembles the English system, they said, and there were shippers' attorneys who were of the opinion that if that system were to be adopted at all it should be adopted in its entirety.

Significance was seen by some in the fact that Commissioner Daniels sat with Commissioner Harlan at the hearing, when it was originally intended that the latter would preside alone, accompanied by examiners who participated in the investigation covering the case. It has been inferred that Mr. Harlan's strong support of the idea of separating the different services does not accord fully by any means with the attitude of other commissioners.

The next step in the case will be the hearing of arguments, and it is proposed to render a final decision in the case in order that the new rates, etc., will become effective on April 1, or at the beginning of the 1917 lake shipping season. In the meantime, Commissioner Harlan announced that the commission will expect Attorney Challen B. Ellis, representing the Pittsburgh Steel Co., Pittsburgh, to file a statement supporting his claim that, if the proposed tariffs go into effect without change they will result in the carriers getting additional revenues of from $500,000 to $2,000,000 a year.

Mr. Ellis was unsparing in his denunciation of the tariffs. He said that the Pittsburgh Steel Co. had made an investment of $17,000,000 at Monessen, Pa., on the written assurances of carriers that that point would not be removed from the Pittsburgh rate district. By the tariffs Monessen is removed from that district and grouped with Johnstown, with a proposed rate of 94c on direct ore, as compared with the proposed rate of 82c for Pittsburgh. It was therefore proposed by the commission, said Mr. Ellis, to set aside those assurances despite the fact that no one had ever complained that the inclusion of Monessen in the Pittsburgh district resulted in discrimination against any one or that there was any necessity why it should be taken out of the Pittsburgh district.

Attorney Richard Jones, representing the Republic Iron & Steel Co., Youngstown, O., said the valleys have been left in a much worse condition as the result of the suggestions of the commission than they were when on May 19, 1913, they filed a complaint against the unreasonableness of the rate of 56 per ton on direct ore to the valleys. He also protested against the proposed dock and spotting charges, and the system of regrouping and said the proposals made in the tariffs would have the effect of disturbing competitive conditions. He insisted that if Monessen is placed back in the Pittsburgh district, then New Castle should be reinstated in the Youngstown district, and that if the old Pittsburgh district is reestablished, then the rate structure as between the Youngstown, Beaver and Pittsburgh districts should be reinstated. The proposed grouping of the Beaver district was said to be unfair to Youngstown because it reduces the latter and enlarges the Midland district.

Urge Webb Bill

Washington, Jan. 9.—At a hearing before the senate committee on interstate commerce last week, H. C. Lewis and R. H. Patchin, of the National Foreign Trade Council, urged passage of the Webb bill, designed to legalize export combinations. They laid before the committee a report which said that, even before the war, doubt as to the application of the anti-trust laws had compelled American firms to compete individually among government encouraged foreign combinations. "Unless the Webb bill is passed," the report said, "and the legality of export co-operation established, many industries of moderate size will be unable to enter foreign trade because of the prohibitive ex-

pense which co-operate effort would reduce."

Chairman Edward N. Hurley, of the federal trade commission, along with representatives of the chamber of commerce of the United States, and other organizations, all supported the measure. In almost every instance protest was made against two amendments placed in the bill by the house. It was stated that one of them rendering illegal combinations engaged in "trading in or marketing" within the United States would defeat the aims of the bill by preventing the export combinations from buying the identical merchandise they would be organized to export. Another amendment that would nullify the purpose of the bill, it was said, makes illegal any export association which "restrains the foreign trade of the United States". It was pointed out that, as a matter of course, the export combinations proposed would technically result in a form of restraint.

Hurley's Resignation

Washington, Jan. 9.—The resignation of Chairman Edward N. Hurley, of the federal trade commission, to become effective Feb. 1, has been learned by business interests of the country with much regret. They had been attracted most favorably to Mr. Hurley because of his splendid efforts as a member of the commission in aiding them. His activities with regard to promoting foreign trade, and of advocating the adoption of a uniform system of accounting perhaps stand out more prominently than any other of his important efforts. The Webb bill was largely a creature of his mind. Moreover, he was a consistent and insistent advocate of better understanding and co-operation between the government and business, and has done much good in that capacity.

His resignation was due entirely to the fact that he has found it necessary to look after his large private interests. For one thing, Mr. Hurley said, the Hurley Mfg. Co. is building a new plant costing between $300,000 and $400,000 in Chicago. Important readjustments in the industrial world are being made, with still greater ones to come, and, as expressed by Mr. Hurley, it is necessary for the "captain to be on the bridge".

Mr. Hurley resented reports that his resignation was due in any way to dissension in the commission, or to differences with the President. On the contrary, he said emphatically that his relations both with other members of the commission and the President have been and are of the most cordial kind. He took occasion in this connection to praise his colleagues on the commission as well as the President. Mr. Wilson has expressed keen regret at Mr. Hurley's resignation, and while it is stated he may urge him to remain in the government service, it seems unlikely that Mr. Hurley will find himself able to do so.

Mr. Hurley expressed particular pleasure for the appreciation of his work shown by the business interests of the country, and said that it was with much regret that he found it necessary to resign. He is enthusiastic over the work done by the commission and said it may be assured that its constructive work will continue without abatement.

EDWARD N. HURLEY,
Chairman Federal Trade Commission

Vice chairman William J. Harris will automatically become chairman of the commission after Mr. Hurley leaves. The resignation of the latter leaves two vacancies in that body, Commissioner George Rublee's nomination not having been confirmed by the senate at the expiration of the first session of the present congress.

Favors Private Plants

Washington, Jan. 9.—Exclusive government manufacture of arms, munitions and equipment for the army is neither desirable nor feasible, according to a report made to the senate last week by a board of army officers and civilians through Secretary of War Newton D. Baker. The board reached its conclusions after making a comprehensive investigation at government arsenals and private munition plants. It was appointed under authority of the national defense act of last June.

It was estimated that to meet the peace needs of the army the government would have to spend $52,000,000 in the erection of plants additional to those now operated by the government. The board estimated that it would require an expenditure of $927,000,000 for additional plants in time of war. The possibility of war was referred to as requiring consideration, and it was pointed out that if the government should enter upon a program of establishing plants capable of meeting war needs, many of the plants would stand idle once those needs had been supplied. The tremendous overhead expenses that would result were also given attention.

Recommendation was made by the board that an arrangement should be entered into with private concerns for a portion of the supply of whatever reserve of arms are required, with due regard to the conversion of the plants to a war basis when necessary. The board further recommended that gages, jigs, dies and other special tools used in plants should be so standardized as to enable manufacturers to turn out vast quantities of war material in a short time and upon an economical basis. The board was composed of Col. Francis F. Kernan, of the Twenty-eighth infantry Lieut. Col. Charles P. Summerall, of the field artillery; Maj. M. M. Fuller, U. S. A., retired; Benedict Crowell, Cleveland, and R. G. Rhett, Charleston, S. C.

Bids Unsatisfactory

Washington, Jan. 9.—Bids which had been readvertised for by Secretary of the Navy Josephus Daniels in connection with three scout cruisers were opened last Wednesday. It is announced they were unsatisfactory. Mr. Daniels therefore will be compelled either to have congress pass additional appropriations for these vessels or to arrange to have them built in the navy yards. The situation was further complicated by reason of the fact that only one company, the Fore River Ship Building Corporation, submitted bids. This company offered to build either one or two of the cruisers for $5,900,000 each, according to the the department's specifications, or $5,825,000 each upon modified plans. The limit of cost set by congress for these vessels being $5,000,000, neither of these offers could be considered.

No satisfactory bid was received with regard to the construction of the ammunition ship provided in the 1917

program. It was stated that the department could not consider the only bids made, that of the William Cramp & Sons Ship & Engine Building Co., which offered to build the vessel upon a basis of cost of construction plus a certain percentage of profit. As a consequence the vessel has been assigned to the Bremerton navy yard. The limit of the cost of the ship is $2,350,000.

Underbid by Hadfields

Washington, Jan. 9.—The fact that bids of Hadfields, Ltd., Sheffield, Eng., were much lower and deliveries promised much shorter than figures offered and deliveries promised by American manufacturers in connection with 4,500 14-inch and 3,000 16-inch armor-piercing projectiles for the United States navy has aroused much discussion in various quarters. The bids, opened by the bureau of ordnance last Wednesday, involved in all 7,200 16-inch and 8,100 14-inch armor-piercing shells and 900 14-inch Class B projectiles.

On the 14-inch shells, the Hadfield bid was $356 each, delivery to begin in 11 months and 500 a month thereafter. The lowest American bid on this class of projectiles was made by the Washington Steel & Ordnance Co., Washington, D. C., which submitted a figure of $500 each for 1,000, delivery to begin in 20 months and 250 a month thereafter. A figure of $513 each was submitted by the English maker on the 16-inch shells, delivery to begin in 11 months and 500 a month thereafter. The lowest American bid was that of the Washington concern also at $750 each for 2,500 projectiles, delivery to begin in 20 months and 165 a month thereafter. Secretary Daniels said he was considering the idea of throwing out all of the bids and asking for new ones so as to get "competition among American makers". He also said he was thinking of asking congress to double at once the appropriation for a government projectile plant.

A number of members of congress, together with Secretary of the Navy Daniels, have seized upon the situation to say that it proves that the American makers are attempting to get extortionate prices from the government, while some have construed it to be conclusive proof of the necessity of the government manufacturing all of its own war materials.

Investigation into the matter, however, indicates that it represents an attempt on the part of the English concern to dump the shells into this country, with the hope that it may establish a future and profitable market here. By reason of the fact that England has been compelled to turn to the United States in order to get sufficient supplies of munitions, it has been a matter of surprise to learn that one of its manufacturers is actually prepared, while that country is at war, to sell projectiles to the United States government. The mere fact that the plant has a surplus capacity as to the production of naval shells is not considered at all remarkable, but it has been naturally assumed that, in view of its needs for other forms of munitions, the English government would call upon it to convert the surplus to the production of pressing requirements.

H. A. Gillis, Washington representative of the English concern, said that to keep its organization busy it obtained permission from the British government to bid for American government contracts, and that Hadfields is ready to put up bond to guarantee that it will meet the severe specifications in the time given and at the prices stated. Moreover, the British concern is to pay the tariff duties. Mr. Gillis went on to point out that Hadfields by its wide experience and present state of efficiency due to the war was in a position to meet the new and especially rigid tests of the bureau of ordnance at less risk than the American firms "without experience". He said he did not think the American firms have been charging the government unreasonable prices. While it has been accepted as possibly true that the British concern is in a position, due to its heavy operations at present, to make the projectiles at attractive prices, it is at the same time thought the figures submitted do not provide for any profit, if they even provide for the cost of manufacture.

Important Papers

Several papers bearing upon subjects of interest to the iron and steel and affiliated trades are being presented at the ninth annual meeting of the American Institute of Chemical Engineers, which began its sessions at the Chemists' Club, New York City, Jan. 10. The papers of this order include "Recent Developments in Chemical Engineering Equipment", by H. D. Miles, president, Buffalo Foundry & Machine Co.; "Corrosion of Ingot Iron Containing Cobalt, Nickel or Copper," by Herbert T. Kalmus and K. B. Blake; "The Fixation of Nitrogen", by Prof. John E. Bucher, and "Recovery of Benzol From Coke Oven and Illuminating Gas", by C. J. Ramsburg, H. Koppers Co. Many other subjects of an industrial chemical nature will be presented.

Large Increase

In Production of Chromic Iron Ore Last Year

The industries that use chromic iron ore have grown enormously in 1916, and according to recent reports made by J. S. Diller, of the United States geological survey, department of the interior, the production in the United States has greatly increased. Two years ago, only one small mine in the United States—in Shasta county, Cal.—was producing chromic iron ore. The output in 1914 was less than 1,000 long tons. In 1915 it increased to 3,281 tons, and in 1916, with producers in a score of counties, the output in California jumped to many thousand tons. Besides the ore produced in California a considerable quantity is now mined in Oregon, and smaller amounts in Wyoming and Maryland, so that the total output for the United States in 1916, so far as reports received show, will exceed 35,000 tons.

All this increase in the home production has been made in spite of largely increased imports. The bureau of foreign and domestic commerce reports that 88,601 long tons of chromite was imported during the first 10 months of 1916—about two and a half times as much as was produced in the United States during the year. The average price abroad of the imported material was $12.66 a ton. Most of it was used on the Atlantic seaboard, for the interior points were supplied, at least in part by the mines on the Pacific coast, where ore containing 40 per cent of chromic oxide has for some months been quoted f. o. b. railroad at $13 to $16 a ton.

Chromic iron ore is a most efficient refractory material for lining furnaces and for making chrome brick and steel alloys, the demand for which has largely increased.

The Ackerman Steel Wheel Co., Cleveland, plans to occupy its temporary plant on Scranton road about Jan. 15. The company has purchased a large volume of machinery recently and is still in the market for additional tools. The temporary plant will have a capacity for 1,000 wheels a day. A new plant is planned by the company to be started some time next summer.

Iron and Money: Fact and Comment

"Income Tax is Unfair and Unreasonable," Says Judge Elbert H. Gary in Statement Just Issued—Deplores Recent Class Legislation

JUDGE ELBERT H. GARY, chairman of the United States Steel Corporation, having been asked for an expression of his views on the current business situation and the future outlook, has issued a statement, in which he discusses the prevalent widespread trade prosperity, its causes and the various problems it presents. While he refrains from giving any view as to what course this country's business will follow after the war, he urges preparation, so far as practicable, against possible unfavorable change in the economic situation. Deeming it appropriate to refer to some of the things particularly applicable to our own welfare which bear on the future economic position, Judge Gary urges that our large capital resources be kept intact, that we may be prepared for emergencies and warns against the danger that great wealth will produce the opposite of necessity—extravagance, indolence, waste, indifference, retrogression, stupidity, failure. He advocates that the United States be placed at least on an equal footing with all other countries from the standpoint of the tariff, and also with regard to transportation facilities on the seas.

Especial stress is laid in Judge Gary's statement upon the relations between capital and labor. He says:

Discriminatory Legislation

"One of the most important subjects for consideration at the present time, as it seems to me, is the danger of discriminatory legislation in this country. Any legislation that is calculated to create dissensions, or to affect favorably one class, as it is called in our general terms, to the prejudice of another, is harmful and vicious, and carried to its natural results may endanger even the national structure itself. Harmony between all classes of people concerning the problems in which all have a direct and personal interest is essential to the best results for all. Antagonisms in thought and intention are liable to create disturbances and generally produce injury and loss. From time to time efforts are made to create friction between capital and those without it, or those possessed of small means or between the employer and the employe. Occasionally these attempts are successful, and both of these interests suffer, and the general public also.

"It is well for the large number of employers to bear in mind that they cannot successfully carry on their affairs without having the labor and loyalty of their employes who constitute a large majority. It may be true that machinery is taking the place of thousands of workmen and that the number may be increased; but it seems certain that the work of multitudes will always be needed for the successful operation of business. It behooves the employer to give constant and intelligent thought to the rights, necessities and welfare of the employes, and this on a basis that the former is dependent upon the latter as a most important unit in business progress.

"And the employe is just as dependent upon the employer. The employes are made up of the unskilled labor, not infrequently designated as common labor, the skilled labor, so-called, and the administrative force. It is plain that the totally unskilled labor could make little progress in collective capacity if left to themselves. Without the assistance of others who are more or less trained and who are capable of initiative, design, construction, organization and administration, the unskilled would be helpless. It is also clear that the skilled laborer or the highly educated or experienced employe could not, without abundant capital, accomplish pronounced success. Therefore, in their own interest, the employes must fully comprehend their dependence upon their employers who provide the capital. And the general public should and undoubtedly does appreciate the importance of according to all classes, fair, just and honest consideration and treatment. No wrong or unreasonable basis will be permanent.

"I regard the income tax law now in force in the United States unreasonable, unfair and inimical to the best interests of the country, for the reason that it tends to create classes and to discriminate between them. There should be, I think, no objection to an income tax. It is as fair to tax incomes as it is to tax any other property. It is right to compel the possessor of means to defray the expenses of the government; but a law which makes a few people pay the total of a large tax, the amount and uses of which may be determined by the remainder of the people, who constitute, by comparison, nearly all of the population, and who are themselves entirely exempt from payment of the fund, is inequitable and dangerous. When the theory of this law is carried to its logical conclusion, who can foretell the result? It is an attempt to forcibly distribute wealth, however honestly acquired; and in its effect is likely to minimize, perhaps destroy, sooner or later, all ambition to progress, to achive, to develop, to occupy a place in the ranks of successful individuals or collection of individuals. Discriminatory legislation hereafter might be applied to clergymen, to professors, to lawyers, doctors, teachers, merchants. Such a law is wrong in principle.

"Any law, every law, should affect all, or at least the great majority alike, except as to degree, so that they should have the same personal and pecuniary interest in its existence or repeal. Laws should be intended to harmonize, not to antagonize. Attention is directed to the clause in the income tax law which exempts an income of $3,000 or $4,000, depending upon the circumstances. Those who are thus exempted constitute more than nine-tenths of the population, probably nine and three-quarters. It is reasonable to have some amount exempted, say $1,000, as in other countries, on the ground that if any family is left without sufficient income to provide the absolute necessities, the public would be or should be compelled to furnish the deficiency. Or the amount which the highest paid unskilled laborer receives might be a fair exemption.

Laws Should Protect All

"All laws, and the administration of all laws, should be based on the endeavor to protect all the people alike, providing equal opportunity, equal punishment when deserved, equal interest in our country its defense and its progress, the encouragement of harmony, of interest in the welfare of each other. It is feared

the tendency is in the opposite direction. The business man has many reasons to be hopeful, but there are signs of future uncertainty."

Steel Stocks Cover Wide Range in 1916

Iron and steel stocks more than held their own during the first week of the new year, most of them registering advances, despite the gloomy feeling in Wall Street during this period and the decline general in most classes of securities. The stock market, like the steel trade, is watching the diplomats. Interest is keen in the outcome of various governmental notes. It is felt that if the peace overtures prove abortive and the war continues, with no prospect of its end until 1918, the entente powers will be compelled to draw upon the United States for steel, copper and other metal, which would mean continuation of present large earnings and would warrant marking up of stock prices. The rise in the steel shares reflects the gradual disappearance of peace hopes as the allies respond in no uncertain terms to the overtures.

Quotations on a number of iron, steel and industrial shares at the close of the New York stock exchange Jan. 6 and net changes for the preceding week follow:

	Close Jan. 6.	Net chg.
American Can	48	+1½
American Can, prfd.	110	+1½
Amer. Car & Fdy.	67	+2⅜
Amer. Car & Fdy., prfd.	116¾	+ ½
American Locomotive	76¾	+ ⅛
American Locomotive, prfd.	105¼	+1½
American Steel Foundries	60	.....
Baldwin Locomotive	57½	.....
Baldwin Locomotive, prfd.	101¾	+ ¾
Bethlehem Steel	495	—25
Bethlehem Steel, prfd.	135	.....
Colorado Fuel & Iron	45½	+ ¾
Continental Can	89½	+1¾
Crucible Steel	63½	+2⅛
Crucible Steel, prfd.	115	+1
General Electric	167	.....
Gulf States Steel	130	+5
International Harv. of N. J.	121	—2
Inter. Harv. of N. J., prfd.	120¾	+ ¾
International Harv. Corp.	83½	—2½
Lackawanna Steel	85½	+3
Nat'l Enmlg. & Stmp. Co.	27⅜	+ ⅜
Pressed Steel Car	75½	+1½
Pullman Palace Car	162¾	— ¼
Republic Iron & Steel	79⅜	+2½
Republic Iron & Steel, prfd.	103½	— ½
U. S. C. I. P. & Fdy. Co.	21½	+ ½
U. S. C. I. P. & F. Co., pr.	61	+1
United States Steel	112¼	+6
United States Steel, prfd.	110	+ ½

Maximum quotations for a number of steel and industrial stocks, not listed on the New York stock exchange, at the close Jan. 5 and Dec. 29, follow:

	Jan. 5.	Dec. 29.
American Ship Building	67⅛	66⅛
Cambria Steel	125	125
Chicago Pneumatic Tool	72½	71½
LaBelle Iron Works	82¾	78½
Lake Superior Corp'n	21½	20¼
Stewart-Warner Speed. Co.	101	101
Warwick Iron & Steel Co.	9¾	9¾
Westinghouse Air Brake	157½	157½
Westingh'se Elec. & Mfg. Co.	55	56⅝

For the entire year 1916 steel stocks covered a wide range of prices, as will be noted from the appended table. The most remarkable example is Bethlehem Steel common, a stock which has provided fireworks many times the past two years. This issue sold as high as 700 and as low as 415 the past year. The equipment shares fluctuated widely, as well. American Locomotive and Baldwin Locomotive decreased sharply during the year. The following table shows the high and low prices reached for the year and the net change as of Dec. 29, 1916, compared with the close of 1915:

	High.	Low.	Year's net chg.
American Can	68½	44	—14¾
American Can, prfd.	115⅜	107⅞	—3½
Amer. Car & Fdy.	78½	52	—13⅜
Amer. Car & Fdy., pr.	119½	115⅜	—1½
American Locomotive	98¼	58	—6¾
Amer. Locomotive, pr.	109	99½	+4½
American Steel Fdries.	73	44	—1½
Baldwin Locomotive	118⅜	52	—60⅜
Baldwin Locomotive, pr.	110	98⅞	—7
Bethlehem Steel	700	415	+65½
Bethlehem Steel, prfd.	186	126	—10
Col. Fuel & Iron	63¼	38⅛	—7⅜
Continental Can	111	75¼	+3¾
Continental Can, prfd.	114	106	+5
Crucible Steel	99½	50¼	—11⅜
Crucible Steel, prfd.	124⅞	108¼	+3
Gen'l Electric	187¼	159	—7½
Gulf States Steel	193	71	+31
Gulf States St'l, 1st pr.	115	87	+13½
Gulf States St'l, 2d pr.	190	72	+33½
Inter. Harv. of N. J.	126⅞	108½	+13
Int. Harv. of N. J., pr.	122	114	+ ½
Inter. Harv. Corp.	90¼	68⅛	+6
Inter. Harv. Corp., pr.	114⅜	104⅞	+6¾
Lackawanna Steel	107	64	+1
Nat'l En. & Stmp. Co.	36½	19¾	—2
Nat'l En. & St. Co., pr.	100½	92	+ ⅜
Pressed Steel Car	88¼	42½	+9⅜
Pressed Steel Car, pr.	108	98½	.....
Pullman Palace Car	177	159¾	—2
Republic Iron & Steel.	93	42	+21½
Republic I. & S., pr.	117	101	—6
U. S. Cast Iron Pipe & Fdy. Co.	28¼	15⅛	—5
U. S. Cast Iron Pipe & Fdy. Co., prfd.	67½	48½	+10¾
United States Steel	129¾	79¾	+17⅜
U. S. Steel, pr.	123	115	+2½
Westinghouse Mfg.	71⅜	51⅛	—15⅛

Midvale Steel Earnings Large

The Midvale Steel & Ordnance Co. started the new year with a season's greeting to stockholders in the form of dividends at a $6 a share rate, which is a 12 per cent rate based upon the par value of $50 a share. The dividend is payable Feb. 1 to stock of record Jan. 20. The company has issued its report for the fiscal year ended Dec. 31, 1916, showing a balance for its $100,000,000 capital stock of $32,169,164, after interest, depreciation and all sub-company adjustments. This is equal to 32 per cent. The growth in earnings was progressive from quarter to quarter. There was an expansion of more than 100 per cent in earning power from the $6,363,767 net of the March quarter to the $13,233,976 earned in the final three months of last year. The Midvale Steel & Ordance Co. has outstanding $45,000,000 bonds. Its net earnings in 1917 promise to exceed the total bonded debt.

The Midvale Steel & Ordnance Co. has purchased the Pittsburgh-Westmoreland Coal Co., owning 16,000 acres of coal lands in Washington and Westmoreland counties, Pa. The price is understood to be $9,000,000.

Financial Crop Ends

Directors of the General Fireproofing Co., Youngstown, on Jan. 30, will recommend to stockholders an increase in capital stock from $2,000,000 to $4,000,000. The company plans to extend its Crab Creek plant.

* * *

Stockholders of the Central Foundry Co., operating plants at Bessemer, Anniston and Holt, Ala., will hold a special meeting Jan. 8 to vote on a proposal to increase the capital stock by an issue of $600,000 first preferred 8 per cent cumulative stock. This issue is to be offered to common and preferred stockholders in the ratio of seven shares of new stock for each 100 shares now owned. It is estimated the company will show earnings of over $700,000 for 1916, as compared with $225,551 in 1915.

* * *

Francis L. Hine and Albert Strauss have resigned as directors of William Cramp & Sons Ship & Engine Building Co. President Henry S. Grove announced intention of resigning in the near future. It is believed that H. H. Hand, vice president and general manager, will succeed Mr. Grove. It is declared that a new alignment of interests has acquired majority holdings of the Cramp company stock and these interests are said to favor the general development of the property and possibly a merger with another big ship builder.

* * *

The Canton Sheet Steel Co., Canton, O., already has arranged to provide land, buildings, machinery and equipment for a steel plant which it proposes to install to supply its own sheet bar requirements. The company is planning three open-hearth furnaces, having an ingot capacity of 100,000 tons a year and a combined continuous blooming mill and bar mill having a capacity of about 90,000 tons a year of sheet bars. The cost of this work will be about $700,000, a substantial part of which will be paid out of the company's present surplus and the remainder out of funds realized from a sale of preferred stock.

* * *

The Pittsburgh Steel Co., in addition to declaring the regular quarterly dividend of $2 a share, has declared a special dividend of $20 a share, making $22 in all, and amounting to $1,540,000. These dividends were payable Jan. 2. The company paved the way toward this declaration during 1916, when it retired, from earnings, an issue of $5,000,000 6 per cent gold notes which were issued to mature annually until Jan. 1, 1920. Capital stock now consists of $10,500,000 7 per cent cumulative stock and $7,000,000 common. The company paid dividends at the rate of 8 per cent per annum from Jan. 1, 1910, to September, 1913, when they were suspended. In April, 1916, dividends on common were resumed at the rate of 2 per cent.

Heavy Export Movement of Pig Iron

Movement Again Exceeds 100,000 Tons in November—Tonnage of Semi-Finished Material Declines—Value of Machinery Shipped Abroad Not So High

FOR some time after inquiries for pig iron began to arrive from foreign countries, the statistics of export did not reflect a heavy movement, and not until October did the reported exports amount to more than 100,000 tons. The tonnage for September was 64,122, and for October, 101,756. The report of the bureau of commerce on iron and steel imports and exports shows that the exports of pig iron for November amounted to 102,786, compared with 24,551 in November, 1915. For the 11 months ending with November, the totals were 507,046 for 1916 and 202,702 for 1915. The exporting of billets shows a decline in November, when 125,038 tons were shipped to foreign lands, compared with 162,679 tons in October. The following table shows exports of pig iron and semi-finished material for the 11 months of 1916 in gross tons:

1916.	Pig iron.	Semi-finished material.
Jan.	18,719	55,315
Feb.	15,061	87,306
Mar.	19,110	107,696
Apr.	18,518	88,764
May	28,293	142,782
June	48,770	116,425
July	28,718	135,827
Aug.	60,264	160,921
Sep.	64,122	163,104
Oct.	101,756	162,679
Nov.	102,786	125,038

The total value of exports of iron and steel and the manufactures thereof for November was $77,570,840, compared with $82,010,972 in the previous month and $48,056,220 in November, 1915. The total value of these exports for the 11 months ending with November, 1916, however, is more than double that for the same period in 1915, the figures being $778,623,250 and $342,575,685, respectively. Comparative figures for imports of iron and steel and the manufactures thereof are as follows: November, 1916, $2,297,299; October, 1916, $2,429,595; November, 1915, $1,868,928.

Imports of ferro-manganese continue to show a decline. In November, 1916, 6,232 tons were received from foreign countries, while 8,114 tons were received in October and 9,787 tons in September. Manganese ore imports for November amounted to 31,225 tons, a slight increase over the 26,078 tons imported in October, 1916, but less than the November, 1915 total of 50,629 tons. The imports of this ore for the first 11 months of 1916 have amounted to 526,525 tons, compared with 251,508 tons in the first 11 months of 1915.

Additional statistics sent out by the bureau of foreign and domestic commerce indicate a decrease in the value of motor trucks exported in October.

IRON AND STEEL IMPORTS, GROSS TONS

	November, 1916.	November, 1915.	Eleven months ending Nov., 1916.	Eleven months ending Nov., 1915.
Scrap	25,095	18,881	84,615	59,316
Pig iron	14,548	8,982	127,173	78,216
Ingots, blooms and billets of steel	1,337	3,901	23,577	14,118
Wire rods	11	567	3,477	4,845
Rails	846	3,305	25,777	77,245
Bar iron	459	1,001	7,424	8,236
Structural	99	173	1,212	1,415
Sheets & plates	112	268	1,496	1,308
Tin and terne plate	38	53	975	2,289
Total	42,545	37,131	275,726	246,988

IMPORTS AND EXPORTS, GROSS TONS.

1915.	Imports.	Exports.
July	20,858	380,340
August	27,556	405,850
September	23,345	382,113
October	34,318	349,843
November	37,131	362,764
December	35,456	353,836
1916.		
January	15,824	354,416
February	20,279	368,869
March	15,159	438,054
April	20,176	384,917
May	32,114	540,580
June	26,786	526,759
July	14,729	503,187
August	32,257	597,739
September	25,559	643,762
October	30,169	610,110
November	42,545	554,856

Metal working machinery also shows a decrease in the value of exports for October, while agricultural implements show an increase in valuation. Only one aeroplane was exported in October, valued at $800. The total value of machinery exported in October, 1916, was $18,479,007, compared with $20,508,455 in September, 1916, and $14,900,148 in October, 1915.

VALUE OF EXPORTS OF MACHINERY.

1915.	Motor trucks.	Agricultural implements.	Aeroplanes.	Metal working machy.
June	$8,578,802	$854,670	$283,212	$3,735,562
July	6,803,001	963,534	880,836	3,872,358
Aug.	4,387,193	1,454,606	588,600	3,624,411
Sept.	5,882,255	1,092,797	101,950	3,363,973
Oct.	4,307,209	818,606	366,892	3,236,079
Nov.	3,837,307	1,054,235	13,770	4,644,713
Dec.	3,920,533	1,338,629	156,347	3,205,788
1916.				
Jan.	3,416,618	1,139,874	.....	3,249,595
Feb.	6,170,367	1,323,578	22,320	4,662,905
Mar.	4,909,179	2,287,605	8,400	6,501,022
Apr.	5,259,480	2,066,512	.....	6,552,397
May	4,357,238	2,277,966	.....	9,935,806
June	3,551,148	1,793,355	20,000	8,465,985
July	3,062,670	2,016,091	10,000	7,814,691
Aug.	4,442,158	2,513,243	24,000	8,134,473
Sept.	5,203,215	1,804,475	5,000	7,901,328
Oct.	3,635,291	2,023,704	800	5,292,802

Exports of zinc, except ore and dross, for October, 1916, were valued at $6,710,442, an increase over the September exports, which showed a value of $5,276,231, while those for October, 1915, were valued at $4,137,921.

IRON AND STEEL EXPORTS, GROSS TONS.

	November, 1916.	November, 1915.	Eleven months end'g Nov., 1916.	Eleven months end'g Nov., 1915.
Scrap	19,559	4,987	197,905	63,085
Pig iron	102,786	24,551	507,046	202,702
Billets, ingots and blooms of steel	125,038	59,510	1,345,826	510,752
Wire rods	12,451	16,358	144,866	151,552
Steel rails	55,022	58,283	499,224	350,548
Steel bars	57,821	38,783	711,152	376,103
Iron bars	4,040	5,766	67,727	35,750
Struc. iron & steel	28,790	24,774	266,001	213,219
Hoops, band and scroll.	3,548	3,968	40,169	26,243
Sheets & plates	45,382	31,963	465,262	387,782
Tin and terne plate	15,816	15,538	209,133	137,667
Barbed wire	23,528	29,638	403,054	222,431
All oth. wire	18,955	17,921	249,474	202,858
Cut nails	326	456	4,529	3,988
Wire nails	11,247	8,374	139,158	83,094
All oth. nails includ. tacks	1,768	966	11,051	8,167
Pipes & fit'gs.	24,800	13,934	208,647	153,840
R. R. spikes	1,289	3,434	22,461	10,625
Bolts, nuts rivets and washers	2,160	2,702	26,999	21,035
Horseshoes	409	750	7,660	15,319
Cast radiators	121	106	2,227	1,954
Total	554,856	362,762	5,529,571	3,178,714

More Ships Needed

Toronto, Jan. 9.—Though the Canadian government has undertaken to furnish 1,500 miles of railway trackage for the transportation system on the western battlefront, it is not at all likely that the order can be filled. The shortage in ocean tonnage renders it practically impossible to forward such an immense amount of steel in time to be of service. About 300 miles of trackage will be sent from the government railways, a portion of which is now ready for shipment at Halifax, but there are no ocean freighters to take it over. In case this lack of tonnage cannot be supplied, the remainder of the track material required will have to be made in England.

The Norton Griffiths Co., which held a $7,000,000 contract for the improvement of the harbor of St. John, N. B., and the construction of

a large dry dock has found after expending approximately $3,000,000 that it is unable to proceed further and thrown up the contract.

World Trade

Will be Discussed by Prominent Men at Pittsburgh Meeting

Hundreds of bankers, financiers and business men from all parts of the United States plan to attend the fourth annual foreign trade convention of the National Foreign Trade Council, which will be held Jan. 25, 26 and 27 at the William Penn hotel, Pittsburgh. The Pittsburgh committee in charge of the convention is headed by J. Rogers Flannery and Col. H. P. Bope is chairman of the committee on arrangements. Several papers of direct interest to the steel trade will be read at the business sessions.

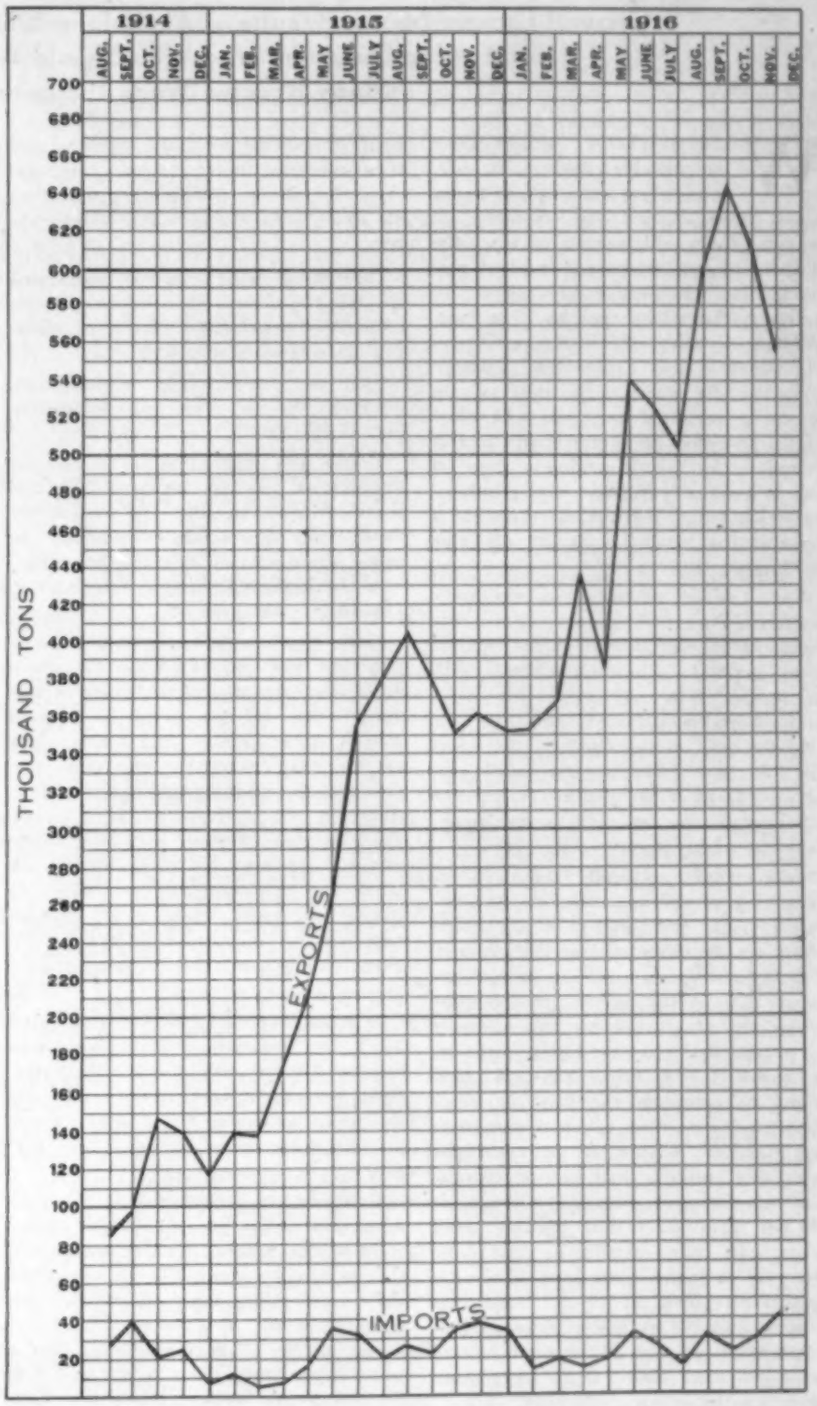
James A. Farrell, chairman, and Robert H. Patchin, secretary of the council, have sent out a preliminary program, which has been distributed among members of the society. The convention will be called to order at 10 o'clock, Thursday morning, by Mr. Farrell, after which an address of welcome will be made by Mr. Flannery, who is chairman of the Pittsburgh Foreign Trade Commission. The subject, "World Trade After the War," will be discussed at the morning session. W. W. Nichols, chairman, United States Industrial Commission of France, will talk about "Industrial Reconstruction in Europe"; Willard Straight, vice president, American International Corporation, New York City, will speak about "The Foreign Trade Aspect of the Tariff". This subject will be discussed by C. H. Bentley, president, California Packing Association, San Francisco, and others.

B. F. Harris, a banker of Champaign, Ill., who is chairman of the Agricultural Commission of the American Bankers' Association, will read a paper, entitled "The World Market for Agricultural Products". "Foreign Trade Policy from the Farmers' Standpoint" is the subject of a paper assigned to T. N. Carver, Harvard University, chief of division of rural organization, United States department of agriculture.

At the afternoon session, "America's Position in World Finance" will be discussed. C. K. McIntosh, vice president, Bank of California, San Francisco, will talk about "Foreign Investment as an Aid to Foreign Trade". Robert H. Patchin, secretary of the council, will read a paper on "The Webb Bill—Its Necessity". This paper will be discussed generally.

At the meeting Friday morning, the national shipping policy will be discussed by Melville E. Stone, general manager, Associated Press, who will talk about "World News and World Trade—the Effect of News Upon American Prestige Abroad", and F. J. Koster, president, San Francisco chamber of commerce, will read a paper on "How Commercial Organizations Can Aid Foreign Trade Development". Various industries of Pittsburgh will be inspected Friday afternoon. The banquet will be held Friday night. Among the speakers are E. N. Hurley, chairman, federal trade commission; John D. Ryan, president, Anaconda Copper Mining Co., New York City.

The final session will be held Saturday morning, at which addresses will be made on "Development of an American Foreign Credit System". A report will be submited by the National Foreign Trade Council on "Examples of Successful American Export Enterprise".


1914
1915
1916
AUG. SEPT. OCT. NOV. DEC.
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
THOUSAND TONS
700 680 660 640 620 600 580 560 540 520 500 480 460 440 420 400 380 360 340 320 300 280 260 240 220 200 180 160 140 120 100 80 60 40 20
EXPORTS
IMPORTS

EXPORTS AND IMPORTS OF IRON AND STEEL PRODUCTS SINCE AUGUST, 1914

News of Employers and Employes

General Crozier Shows Results of Abolishing Efficiency Methods—Interesting Question as to Who Should Be "Fired"—Many Receive Wage Increases

WASHINGTON, Jan. 9.—The remarkable decline in efficiency at the Watertown, Mass., arsenal that has resulted by reason of the elimination of scientific shop management from that plant was recited to the house committee on military affairs last week by Brig. Gen. William Crozier, chief of the bureau of ordnance, war department. Before congress did away with this system at the government arsenals and navy yards, it was operated more nearly complete at the Watertown than at any arsenal or yard, and was eliminated from that institution through a rider in the fortifications act, effective in August, 1916.

Gen. Crozier submitted to the committee a detailed report as to the effect of the legislation at the Watertown arsenal. The report dealt with 49 instances of the same job done under both the premium and date rate systems, and in one-third of the cases the job was done by the same employe. Neither the employes nor the officers of the arsenals were aware that the tests were being made.

One striking example related to the retacking of 4.7-inch shells. An employe "did" 100 shells in 10 hours under the premium system last August. The following day he was given another 100 shells to do, to be paid under the act forbidding the payment of premiums. On this latter occasion, it required the same employe 22.95 hours to complete the task, or more than twice the time taken to complete the first job. Under the premium system, this employe had earned for the six months preceding an average of 35 per cent over his regular daily wage. In other words, he had done the jobs in just a little less than what was ascertained to be a reasonable time as denoted by use of time studies, a premium of 33-1/3 per cent having been provided where tasks were completed within reasonable time.

"Ought not that man have been fired for taking so long to do the second job?" inquired Representative Shallenberger.

"No; those who voted for the legislation ought to be fired," retorted Representative Gordon.

The worst example cited by Gen. Crozier was that of a man who was put to work cutting a slot in a 4.7-inch base plug. He did 100 plugs in 2.66 hours under the premium system, and then, working under the day rate system, did 20 in 2.25 hours, requiring 4.2 times longer under the latter system.

One of the representatives suggested to Gen. Crozier that it might be difficult to restore the system of scientific management.

"All you have to do," replied Gen. Crozier, "is to take the legislation out of the bill."

While the legislation as it affects Watertown arsenal is carried in the fortifications act, and the committee on military affairs was considering the army appropriation bill, the latter carries the same character of legislation affecting other arsenals.

Gen. Crozier called attention to a letter he had received from an officer at Watertown arsenal, in which it was stated that it was perfectly evident that a great change had taken place at that plant since the efficiency system had been eliminated. The atmosphere, it was pointed out, is different, there is more loafing than for years, no one appeared to know how much work had fallen off, the men have no desire to exert themselves because there is no incentive to do so, and there is a general lack of co-operation and of suggestiveness.

It was asserted by Gen. Crozier that after the premium system had been instituted for a year or more at Watertown arsenal, it was found a man did 2.7 times as much under that system as was done under the day rate system.

Replying to questions as to why employes were not discharged when they began loafing, Gen. Crozier said it was almost impossible to say when they were idling away their time, and he pointed out, in reference to a statement in the letter mentioned, that a man might "sit on a keg" and still be doing his work. Moreover, Gen. Crozier said most of the men are under the civil service system, and that their discharge would involve long explanations. It was also stated that if they were discharged there was no reason to think improved work could be expected under the day system from their successors. A further obstacle was found in the fact that many of the employes are members of labor organizations, which officially oppose efficiency systems, or anything else that causes an increase in production.

That the committee was impressed with Gen. Crozier's testimony as to the ill effects of elimination of scientific shop management from the arsenals was evident. Most of those who examined him showed plainly they were in favor of restoring the system. But that the committee will actually attempt to strike the anti-efficiency rider from the bill may be doubtful in view of the hostility of organized labor toward scientific shop management and the amazing influence those laboring interests have over legislation.

An Interesting Question

Youngstown, Jan. 9.—At the bi-monthly examination of the sales sheets of the independent rolling mill operating under the annual wage agreement of the Amalgamated Association, to be held this week, a novel situation will present itself to the bar iron division, inasmuch as the scale arrived at at the Atlantic City convention last summer, gave figures up to only a 2-cent card, which was reached Nov. 10.

It must now be decided whether or not the new figures will continue to give a 25-cent jump with each point advance or 10 cents, as specified from the base rate at $5.50 to a 1.30c card at $6. This is the first time in the history of the bi-monthly examinations that such a condition has presented itself.

Extra Payment

The Kempsmith Mfg. Co., Milwaukee, Wis., has notified its employes of an extra payment plan by which all employes remaining with the company during the next year will receive an extra payment amounting to 10 per cent of their total wages. The plan of payment, as outlined by the company, is as follows:

Two and one-half per cent of the earnings for the first quarter, payable at the end of that period.

Five per cent of the earnings for the first six months (less sum previously distributed) payable at the end of that period.

Seven and one-half per cent of the earnings for the first nine months (less

sums previously distributed), payable at the end of that period.

Ten per cent of the earnings for the year 1917 (less sums previously distributed), payable at the close of the year.

Employes entering the service of the company between the first and fifteenth of the first month of any quarter will participate in the payment for that quarter and remaining quarters of the year. At Christmas, all employes who had been with the Kempsmith company two years or more received a present of two weeks' salary.

Bonuses to Eight Thousand Men

The Worthington Pump & Machinery Corporation, according to announcement by Vice President C. P. Coleman, will pay bonuses to its 8,000 employes. Bonuses of 10 per cent, based on 1916 salaries, were paid Jan. 4 to all officers, engineers, salesmen, clerks and foremen. Mechanical operatives will receive monthly bonuses graduated up to 10 per cent of their wages, beginning January, 1917. The scale for the latter is: Seven per cent of the first month's wages, 8 per cent of the second month's wages, 9 per cent of the third month's wages and 10 per cent each month thereafter. The bonuses to the mechanical operatives will be paid at the end of each month.

More Pay in Navy Yards

Washington, Jan. 9.—Increases in pay, ranging from 8c to 50c a day, have been granted to 4,000 employes of the navy yards for 1917, as the result of the new scale just announced by the navy department. The wage schedules at the yards are readjusted annually and this year there was in no instance a decrease in pay. The increased wages of the government employes in the yards correspond to increases paid to employes in similar lines in private establishments.

The greatest increase went to metal workers. Owing to the conditions of the present labor market, directions have been given not to take on any more men at the minimum rates at this time.

Gifts to Many Men

An important application of group life insurance to the iron and steel industry was made when the Upson Nut Co., the Union Rolling Mill Co. and the Lamson & Sessions Co., Cleveland, placed through the A. D. Hatfield agency of the Aetna Life Insurance Co., policies which will give to each employe at death the equivalent of a year's wages or salary with certain minimum and maximum amounts applying.

This insurance participation was announced to the employes of these companies, numbering altogether nearly 4,500 men, as a New Year's gift. The total amount of insurance involved would amount to about $6,000,000. The entire expense of the policies is borne by the companies.

May Buy Shares

A plan of stock participation by its employes has been worked out by the officials of the Midvale Steel & Ordnance Co., and preliminary details have been announced. The employes will be given the opportunity to purchase at a price of $60, shares of the company of $50 par value. An income of $6 a year, or 12 per cent rate on par value, it is understood, will be guaranteed for each share for a five-year period.

Wage Increases

The Woodward & Powell Planer Co., Worcester, Mass., has granted its machinists a bonus of 10 per cent, effective Jan. 1. According to a new plan if they work 55 full hours a week, the men will receive pay for 60 hours.

The Johnson Carlyle Machine Co., Manchester, Conn., maker of marine reverse gears and friction clutches, has given its employes a 10 per cent bonus for the last 13 weeks of 1916 based upon their wages and for the rest of the year a bonus of 5 per cent payable Jan. 10.

The Morgan Construction Co., Worcester, Mass., gave its employes a Christmas present in the form of a savings bank book with a deposit to their credit. All who have been with the company three years, about 150, shared in the gift. It was made because the company has discontinued its monthly bonus payments, started since the European war.

The S. W. Card Mfg. Co., Mansfield, Mass., taps and dies, has declared a dividend to its 300 employes, payable the first week in January. All who have been in the employ of the company five years or more will receive a 5 per cent dividend, based on their earnings of 1916; those who have been in the employ between three and five years will receive 4 per cent; between one and three years, 3 per cent and under one year 2 per cent.

The American Smelting & Refining Co., Perth Amboy, N. J., has granted a bonus to all salaried employes amounting to 15 per cent of their annual wage. The distribution does not affect the employes who work on an hourly or time basis. The latter have been advanced to a minimum rate of 29 cents per hour, which with a premium granted to English-speaking workmen, makes the minimum for the latter 30 cents an hour.

A general bonus of an extra month's pay to all its salaried employes is announced by the Goulds Mfg. Co., pump makers at Seneca Falls, N. Y. The action affects all office employes both at the home and branch offices and all shop employes who work on a weekly or monthly basis.

A wage increase of 10 per cent to all piece work, hour and day men was accorded by the company in November.

Will Make High Speed Tools

Toledo, O., Jan. 9.—The High Speed Tools Corporation, of New York City, has taken over the business of the Boerder Process Steel Co., of this city. The plant of the High Speed Tools Corporation in East Toledo will be closed and all production confined to the plant of the Boerder Co., on Ottawa street. The new concern will engage in the manufacture of high speed steel tools, either forged or cast by the new Boerder process. Material for these tools will contain not less than 19 per cent tungsten. The sale of tungsten ore to outside interests will be discontinued, as the company will use all it can refine for its own products. The latest design in machinery has been installed in the plant and new business is already coming in. The concern is incorporated under the laws of New York, with the privilege of doing business in Ohio, for $1,000,000. Ernst Boofes, of New York City, is the president; Mr. Enyon, treasurer; W. Boerner, secretary. Mr. Boerder has been appointed general manager and is a member of the board of directors. The company will also maintain an office in New York City.

The Fuller Engineering Co., Allentown, Pa., has been awarded the contract for the pulverized coal equipment for the eight 60-ton open hearth furnaces at the Donora works of the American Steel & Wire Co., and for similar equipment for the heating furnaces of that company at the American works, Cleveland. The Fuller company will also furnish the pulverized coal equipment for the two open hearth furnaces at the No. 1 Lehigh plant of the Bethlehem Steel Co., South Bethlehem, Pa.

Foreign Tool Orders Again Booming

Heavy Shipments Are Being Made Abroad While Domestic Business Continues to Hit the High Spots—Railroad Lists Boost Sales—Many Cranes Are Purchased

MARKED improvement in export demand is at present the chief feature of the machine tool market. Most of the foreign business is coming from France, England and Italy, and some fair orders also are being received from Japan. The tools involved mostly are engine lathes, drill presses, turret lathes, milling machines and screw machines, although all other kinds of machine shop equipment are included. Among inquiries which have just come out is one for 250 engine lathes of various sizes, and another for 150 engine lathes, all for export shipment. Domestic demand shows no falling off from preceding weeks, while inquiries from some sources have increased. This particularly is true with respect to the railroads, which are placing important requirements. The Maine Central has placed about $15,000 to $20,000 worth of machinery and the Chicago & Rock Island about $50,000 to $60,000 worth. The Union Pacific, in addition to the purchases recently reported, has purchased a number of tools and has issued some new inquiries. The Lehigh Valley has purhcased five or six machines and the Baltimore & Ohio continues to place a few tools each week. The Chicago, Burlington & Quincy has asked for bids on a number of tools. The Pennsylvania railroad has purchased two 100-ton Niles cranes for installation in its Altoona, Pa., shops.

Included in the more important business now pending are the requirements of the General Electric Co. for the new plant it proposes to build at Bloomfield, N. J. Some time ago this company issued an inquiry for about 60 tools for this plant; it now has issued a supplementary list of about 100 tools, including principally drill presses, screw machines and milling machines. The New York Ship Building Co., Camden, N. J., and the Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, each has purchased several tools. The Newport News Ship Building & Dry Dock Co., Newport News, Va., has purchased some equipment, including one 200-ton, 80-foot span, Shaw traveling crane, to be installed in its erecting shop. The Norton Grinding Co., Worcester, has placed an order for a 10-ton crane with the Pawling & Harnischfeger Co., Milwaukee. The most important crane business now pending comprises 35 to 40 cranes of various capacities for installation in the Steelton plant of the Bethlehem Steel Co. The government shortly is expected to place orders for several hundred thousand dollars worth of cranes for installation at Norfolk, Va., and the Frankford arsenal, Philadelphia. Worth Bros. Co., Commercial Trust building, Philadelphia, which has let a contract for the construction of a new steel plant at Claymont, Del., is expected in the market shortly for equipment.

The Ferguson Steel & Iron Co., Buffalo, has let a contract for the construction of a new fabricating plant. The Forsythe Metal Goods Co., East Aurora, N. Y., has let a contract for a new plant. The Strong Steel Foundry Co., Buffalo, has let a contract for a foundry addition. Jos. T. Ryerson & Son will build a warehouse addition at Jersey City, N. J. The Stamford Electrical Fittings Co., Stamford, Conn., will build a plant at Elizabethport, N. J. The Hood Rubber Co., Watertown, Mass., has let a contract for a foundry. The North American Motors Co., Pottstown, Pa., is to erect a large plant. The Dundore Mfg. Co., Reading, Pa., manufacturer of tools and machinery, is about to build a new plant. The Stanley Works, New Britain, Conn., is about to erect a plant extension. The Waterbury Foundry Co., Waterbury, Conn., is about to erect a foundry addition.

Chicago Market Picking Up

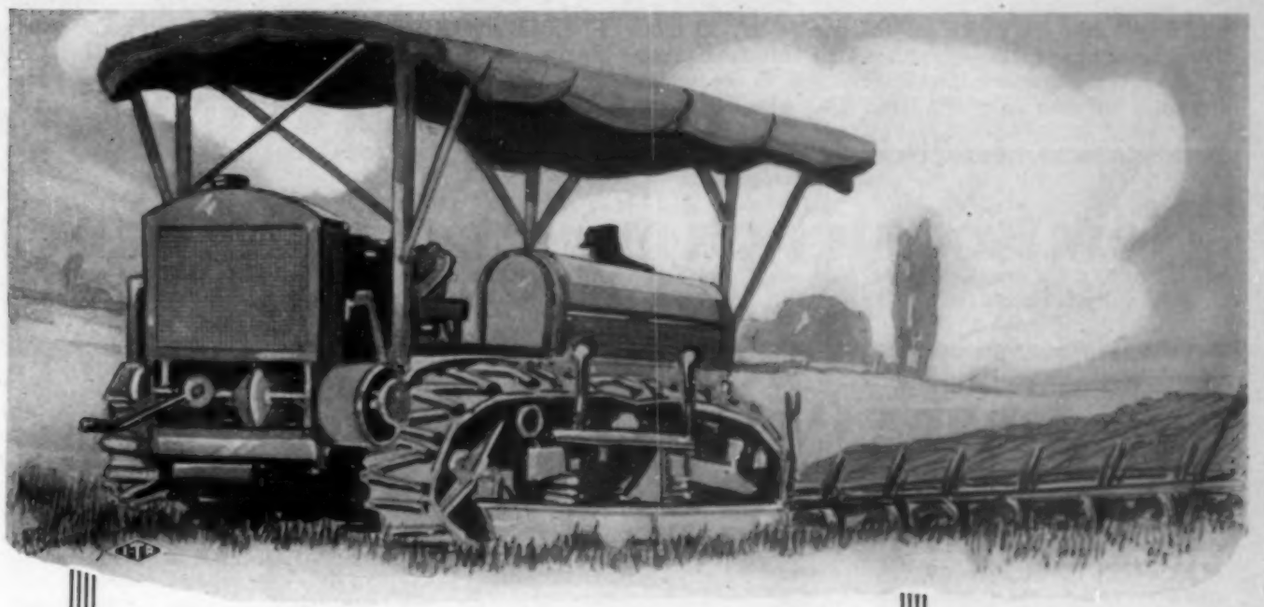
WITH the opening of the new year, dealers in machine tools in Chicago find an active demand for equipment. After the lull which was felt just before and during the holidays, the present condition is most gratifying. Inquiries are coming mostly in small lots and from a wide variety of buyers and indicate a growing demand for finished products which shops can meet only by adding to their equipment. Little export business is being offered to dealers and it appears that many orders are being placed directly with the builders. Numerous price changes have been made recently, lathes have advanced about 12½ per cent, drill presses 10 per cent, punch presses 20 per cent and milling machines from 5 to 10 per cent.

Good Buying in Prospect in Pittsburgh

NOTWITHSTANDING the possibilities of peace, machine tool dealers at Pittsburgh believe 1917 will be equally as satisfactory as 1916. Virtually every manufacturer in western Pennsylvania contemplates the building of additions and further extensions to industrial plants this year. The Jones & Laughlin Steel Co. has ordered two 75-ton and seven 10-ton electric cranes for its Soho works, Pittsburgh; the Brier Hill Steel Co., Youngstown, has bought a 25-ton crane and the Lukens Iron & Steel Co., Coatesville, Pa., has closed for four 30-ton cranes. The Carnegie Steel Co., the National Tube Co. and other corporation subsidiaries are likely to be conspicuous buyers of rolling mill and machine shop equipment during 1917 for new plants in the central west.

New Plant Extensions in Cincinnati

THE demand for machine tools is not as good as it was at the beginning of 1916. Manufacturers are catching up on deliveries, partly because the facilities of their plants have been increased in the past year, and partly because sales of single tools for spot shipment between deliveries on contracts, are growing more and more scarce. At the beginning of 1916 a strong market existed with European nations; today, almost all sales are to domestic users. The demand for milling machines recently has been equal to that for lathes, which is the first time such a condition has existed for several months. That a large number of manufacturers have faith in the future of the machine tool market is shown in the fact that they are still planning extensions to their plants. The Cincinnati Planer Co., which has just completed a casting house, 65 x 150 feet, and will



Back to Nature

Out on those enormous farms that help to feed the nation, tractors travel back and forth with ceaseless regularity. And it's downright hard work that these tractors are up against—it's a long pull and a strong pull—there's hardly a let-up.

If the vulnerable parts of a tractor are not made of the right materials, there will be a breakdown — AND FARMERS NEVER FORGET!

AGATHON STEELS are made for the one purpose of preventing breakdowns. Their record for reliability and durability is well known to most manufacturers.

Wherever you have occasion to use AXLES, SPRINGS, CONNECTING RODS, CRANK SHAFTS, PISTONS, CAMS, GEARS, etc., play safe and specify

AGATHON STEELS

"AGATHON" Chrome Nickel
"AGATHON" Chrome Vanadium
"AGATHON" Nickel Steels
"AGATHON" Vanadium
"AGATHON" Chrome Steel
"AGATHON" High Carbon
"AGATHON" Special Analyses

THE CENTRAL STEEL COMPANY

MASSILLON, OHIO

Detroit Office—326-27-28 Ford Building, F. Walter Guibert, District Representative
Cleveland Office—Hickox Building, The Hamill-Hickox Co., District Representative
Chicago Office—Room 1511-12 Lytton Building, 14 East Jackson Blvd., A. Schaeffer, District Representative
Philadelphia Office — 902 Widener Bldg., Frank Wallace, District Representative
J. E. Dockendorff & Co., 20 Broad St., New York, N. Y., General Export Agents

extend its main shop with an addition 80 x 150 feet. Plans for a new factory for the Acme Machine Tool Co. have been completed, and work will be begun at once on a building 25 x 400 feet. The Allis-Chalmers Co. will add 20,000 square feet of floor space to its factory in Norwood, O., and the Ladel Mfg. Co., New Philadelphia, O., will build a foundry and machine shop to cost $75,000.

New Construction and Equipment

What it is **Where it is** **Who's doing it**

Among New England Factories

BRIDGEPORT, CONN. — The National Mfg. Co. has been incorporated with $25,000 capital by Andrew Tuecker, L. J. Angeo, Stephen Toth, William Miller, Charles McLean and James Miller.

DERBY, CONN. — The General Ordnance Co., manufacturing non-recoil aeroplane guns, is erecting large additions which are expected to double the capacity of its plant.

HARTFORD, CONN.—Hall-Thompson Co. has let a contract for the erection of a 3-story, 42 x 100-foot plant.

HARTFORD, CONN.—The Hartford Special Machinery Co. has purchased land on Homestead avenue adjoining its plant with a view to possible future expansion.

HARTFORD, CONN.—Hartford Industrial Development Co. is about to erect a 4-story, 60 x 317-foot plant with a 1-story, 64 x 64-foot wing for the Underwood Computing Machine Co.

NEW BRITAIN, CONN.—Landers, Frary & Clark are about to erect a 4-story, 30 x 170-foot addition.

NEW HAVEN, CONN.—Regal Silver Mfg. Co. has let a contract for the erection of a 1½-story, 29 x 40 x 40-foot plant addition.

NEW HAVEN, CONN.—The New Haven Rendering Co. will build a brick, mill construction, 3-story, 32 x 88-foot locker building and a 2-story, 50 x 50-foot office building.

NEW LONDON, CONN.—The Adams Coal Mining Machinery Co. has been incorporated with $10,000 capital by Henry Adams, Nathan Belcher, William Belcher and W. H. Belden.

WATERBURY, CONN. — American Brass Co. has let a contract for the erection of a 1-story, 18 x 120-foot manufacturing addition.

WILLIMANTIC, CONN. — The Laundry Machine Co. maker of mangles and steam iron presses will build a brick, 2-story, 80 x 150-foot manufacturing building on Wilson street.

BEVERLY, MASS. — The purifying plant of the Beverly Gas & Electric Co. was damaged by fire to the extent of $35,000.

BOSTON, MASS. — Jas. Russell Boiler Works Co. has let a contract for the erection of a 1-story and basement, 110 x 147-foot manufacturing building.

BOSTON.—The Turner Construction Co. has received contract for a reinforced concrete and brick, fireproof, 11-story, 140 x 150-foot cold storage plant for the Quincy Market Cold Storage & Warehouse Co. on T. wharf.

BROCKTON, MASS.—W. W. Cross & Co. has let a contract for the erection of a plant addition.

CAMBRIDGE, MASS.—The Sterling Products Co. has been incorporated to make machinery with $150,000 capital by Richard C. Cox, Alfred W. Blair and Julia Pearson.

CAMBRIDGE, MASS. — Lever Bros. will build three brick and steel, fireproof, 3-story, 64 x 210-foot, 3-story, 42 x 65-foot and a 2-story, 25 x 220-foot factory buildings at Burleigh street and Broadway.

CHELSEA, MASS.—The Samuel Cabot Co. will build a wood and iron, 2-story, 40 x 75 x 78-foot factory building on Marginal street.

NEW BEDFORD, MASS. — The proposed mill of the Continental Wood Screw Co., 13 Hamilton street, will be of brick, mill construction, 2 stories and basement, 40 x 260 feet, with a brick, 1-story, 28 x 30-foot boiler house.

SALEM, MASS.—David Frye will build three brick and wood, mill construction buildings to include a 4-story manufacturing plant, 1-story storehouse, 1-story boiler house and a garage on Boston, Pope and Proctor streets.

SOUTHBRIDGE, MASS. — The Hamilton Woolen Co. will build a brick, 2-story factory building on River street.

SOMERVILLE, MASS.—Plans are being figured for a brick, 1-story factory for the American Tube Works, 440 Somerville avenue.

SPRINGFIELD, MASS. — The Gilbert & Barker Mfg. Co. has let a contract for the erection of a manufacturing addition to cost about $300,000.

SPRINGFIELD, MASS. — Quality Saw & Tool Co., Geo. H. Leary, 40 Napier street, has let a contract for the erection of a 1-story, 50 x 100-foot plant addition.

SPRINGFIELD, MASS. — The Berkshire Realty Co. is considering bids for a brick and reinforced concrete, fireproof, 3-story, 60 x 125-foot building to cost $45,000 at 482 and 484 Worthington street.

TAUNTON, MASS. — Presbrey Stove Lining Co. is about to erect a 3-story, 40 x 60-foot addition.

WATERTOWN, MASS.—Engineers Monks & Johnson, 78 Devonshire street, Boston, have completed plans for a projectile machine shop and other buildings to be added to the Watertown arsenal at a cost of about $800,000.

WEBSTER, MASS.—Jesse Prescott, owner of the J. B. Prescott & Son foundry and the Webster Auto Parts Co., will erect a new 4-story manufacturing building.

WORCESTER, MASS.—Wright Wire Co. has let a contract for the erection of a 1½-story, 29 x 40 x 40-foot plant addition.

WORCESTER, MASS.—Andreson & Patterson will build a brick, fireproof, 5-story manufacturing building at Franklin and Grafton streets.

WORCESTER, MASS.—The Baldwin Chain & Mfg. Co. has let contract for a brick, mill construction, 2-story, 95 x 81.4-foot building on Hygeia street.

WORCESTER, MASS. — The American Steel & Wire Co. has let contract for a brick, 1-story, 33.7 x 68.10-foot thread mill building at its north works.

WORCESTER, MASS. — The Ramsdell Specialty Co., maker of screws, has let contract for a wood, mill construction, 1-story, 50 x 70-foot addition to its shop at 667 West Boylston street.

WORCESTER, MASS.—The Ramsdell Specialty Co. has been incorporated to manufacture machine screws with $100,000 capital by Frederick M. Ramsdell, president; Louis A. Ford, treasurer, and Miss G. A. Quinn, clerk.

Along the Middle Atlantic Seaboard

NEW YORK. — The Roth Wind Power Ventilator & Fan Co., has been incorporated with $50,000 capital, H. E. Walker, E. I. Rudd, A. F. Roth, 35 Nicholas terrace.

NEW YORK.—The Forbes Tool Co. has been incorporated to manufacture hardware and tools with $100,000 capital by R. E. Pearsall, H. D. Penney and E. W. Forbes, 30 Broadway.

NEW YORK. — Martex Corporation, 46 Cedar street, is about to make alterations to a 2-story, 82 x 99-foot building with 2-story, 25 x 52-foot wing for occupancy by the Washburn Wire Co., 548 East 118th street.

BROOKLYN.—A 4-story, 100 x 160-foot manufacturing building is to be erected here at Atlantic avenue and Milford street for the S. Weisglass Co., maker of brass beds.

SHOOTERS ISLAND, S. I., N. Y.—Fire on Dec. 29 caused heavy damage to the plant of the Standard Ship Building Corporation here. The mold loft, the plate shed and the boiler shops were damaged to the extent of about $250,000.

AVENEL, N. J.—The large plant being erected here for the Steel Equipment Co. rapidly is approaching completion. The plant is two stories, and contains 100,000 square feet, not including storage sheds, garage, etc. The company, which is to manufacture steel furniture, already has begun the installation of cranes, shearing machines, etc.

BELLEVILLE, N. J.—The National Pottery Co., New York, located at 333 Sixth avenue, Newark, has purchased a big tract along the Erie railroad at Cortlandt street

Tomorrow may be too late!

DO IT NOW!

Every day you delay makes your opportunity of getting iron ore more doubtful.

Can you afford to take chances on having to turn down the business of many of your old time, faithful customers?

Then place your order for iron ore ***now***—do it before it is too late!

We are in a most excellent position to interest you in ***Service, Quality*** and ***Price.***

SHIPMENTS OF OUR LAKE SUPERIOR IRON ORES ARE MADE FROM OPEN PIT MINES.

Let Us Know Your Requirements.

The Tod-Stambaugh Company

Perry-Payne Building

CLEVELAND - - OHIO

IRON ORE

Say you saw it in THE IRON TRADE REVIEW

for the erection of a new plant, the first section to cost $20,000.

BELLEVILLE, N. J.—The first of the temporary buildings to be used by the Kent Motors Co. has been completed and the output of the company now is two automobiles a day. Work has been begun on another temporary structure and several more will be erected within the next few weeks. The contract for the concrete and steel buildings which will constitute the permanent plant will be awarded but it is unlikely that construction work will be begun before spring. Alex. H. Conquest, formerly chief engineer of the Damler Co. is in charge.

BLOOMFIELD, N. J. — Westinghouse Lamp Co. has let a contract for the erection of a 1-story, 32 x 85-foot addition.

BLOOMFIELD, N. J. — Architect Fred Pierson is preparing plans for a 3-story plant to be erected by Owen Rodgers, who is to manufacture novelties.

BLOOMFIELD, N. J. — General Electric Co., Schenectady, N. Y., has issued a list of about 100 tools for installation in the large plant it proposes to erect here. The list comprises mainly drill presses, screw machines and milling machines and is supplementary to the original list of about 60 tools issued some time ago.

ELIZABETH, N. J.—Work has been begun on the new copper rolling mill for the Waclark Wire Co. It will be 290 feet long and will vary in width. It will be constructed of steel, concrete and brick.

HARRISON, N. J.—A. Allan & Sons, 482 Greenwich street, New York, manufacturers of red metals, are about to locate a plant here.

HARRISON, N. J.—The Reuther Bros. gray iron foundry on Middlesex street, has been purchased by the Hyatt Roller Bearing Co. An addition to the foundry was in the course of construction at the time of the transfer. Reuther Bros. will erect a new foundry on Essex street, between Sixth and Seventh streets.

JERSEY CITY, N. J.—C. Botjer & Sons, Inc., have let a contract for the erection of a 1-story, 90 x 155-foot manufacturing building to be occupied by the Bradley Axe Co., now located at Newburgh, N. Y.

KEARNY, N. J.—The Seaboard By-Products Co. will shortly begin the erection of new factory buildings on its site on the Kearny meadows, near the Newark turnpike, to cost $50,000.

MARLBORO, N. J.—Worthley & Holland has been incorporated to manufacture and deal in mill supplies and electrical apparatus, with $40,000 capital, by Abbott Worthley, Alfred J. Holland, Robert C. Schanck Jr., Marlboro.

NEWARK, N. J.—Igoe Bros., manufacturers of nails and wire are about to erect a 1-story, 50 x 98-foot addition.

NEWARK, N. J. — The Newark Rivet Works has let a contract for a 2-story, 68 x 78-foot storage building.

NEWARK, N. J.—National Welding Co. has commenced the erection of a 1-story, 35 x 54-foot extension.

NEWARK, N. J.—Cyrus Currier & Sons have been granted a permit to erect a 1-story steel foundry shed.

NEWARK, N. J.—Eclipse Tanning Co. has been granted a permit for the erection of an extension to its machine shop.

NEWARK, N. J.—The Chas. Burroughs Co., 141 Commerce street, has let a contract for the erection of a 2-story, 75 x 88-foot machine shop and office building.

NEWARK, N. J.—Union Smelting & Refining Co., New York, has purchased 11 acres on St. Charles street at Avenue L, and will erect on it several modern buildings to cost about $250,000.

ORANGE, N. J. — Architects Gilbert & Price, Woolworth building, New York, have completed plans for a new building for the Radium Aluminum Material Corporation.

PERTH AMBOY, N. J. — The Standard Underground Cable Co. has been granted a permit to erect a 1-story addition.

PHILADELPHIA.—Ross Tacony Crucible Co. has let a contract for the erection of a 3-story, 71 x 99-foot plant addition.

PHILADELPHIA.—Penn Metal Ceiling & Roofing Co. has let a contract for the erection of a 10-story, 80 x 90-foot manufacturing and storage building.

PHILADELPHIA.—Link Belt Co. has let a contract for the erection of a 1-story, 216 x 221 and 32 x 79-foot machine shop addition.

PHILADELPHIA. — Wiedemann Machine Co. has let a contract to Barclay, White & Co., Presser building, for the erection of a 1-story, 83 x 157-foot machine shop.

PHILADELPHIA. — Barrett Mfg. Co., Bermuda and Margaret streets, has started work on the erection of a 1-story, 56 x 65-foot addition.

BALTIMORE.—Baltimore Enamel & Novelty Co. has let a contract for the erection of a 2 and 1-story, 262 x 458-foot plant to cost about $200,000.

Activities in the Central States

BINGHAMTON, N. Y.—The Mollen Transfer Co., Erie railroad station, plans to erect a 4-story warehouse, 50 x 125 feet on Warren street, to cost about $50,000. Moores & Dunford, 10 South LaSalle street, Chicago, are preparing the plans.

BUFFALO.—A. B. Schultz, 786 Ashland avenue, plans to erect a 2-story motor factory, to cost about $10,000.

BUFFALO.—Ferguson Steel & Iron Co., 1499 Bailey avenue, is about to erect a new fabricating shop to cost about $200,000.

BUFFALO.—The Houck Mfg. Co., 1700 Elmwood avenue, plans to erect two 3-story factory buildings, 60 x 300 feet. R. J. Reidpath & Sons, Builders' Exchange, are preparing the plans.

BUFFALO.—The American Radiator Co., 1741 Elmwood avenue, has awarded the J. W. Cowper Co., 721 Fidelity building, a contract for an addition to its plant, to cost about $25,000.

BUFFALO.—The Buffalo Foundry & Machine Co., East Ferry street and Fillmore avenue, plans to erect a 3-story storage building and pattern shop, 53 x 243 feet, to cost about $50,000. R. J. Reidpath & Son, Builders' Exchange, are preparing the plans.

DUNKIRK, N. Y. — Atlas Crucible Steel Co. has let a contract to the McClintic-Marshall Co., Pittsburgh, for the erection of a 1-story, 70 x 400-foot rolling mill.

ELMIRA, N. Y.—G. W. Peck plans to build a 3 or 4-story warehouse on Seventh street.

GENEVA, N. Y.—Standard Optical Works has had plans completed for a plant addition.

ROCHESTER, N. Y. — The Vacuum Oil Co., 904 Exchange street, plans to build an addition to its plant, to cost about $15,000.

ROCHESTER, N. Y.—Eastman Kodak Co. is about to erect a new building to be known as factory No. 50 to cost about $100,000.

AMBRIDGE, PA. — The Duquesne Light Co., Pittsburgh, has purchased a site here and plans to build a sub-station. F. Uhlenhaut Jr., Pittsburgh, is chief engineer in charge of the work.

AMBRIDGE, PA.—The board of education plans to erect a 2-story school, 166 x 312 feet, to cost about $45,000. W. W. Williams, Magee building, Pittsburgh, is preparing the plans.

AMBRIDGE, PA.—The board of education plans to build a 2-story school, 166 x 312 feet, to cost about $50,000. W. W. Williams, Magee building, Pittsburgh, is preparing the plans.

BRADDOCK, PA. — The Sterling Steel Foundry Co. has awarded the McClintic-Marshall Construction Co., Oliver building, Pittsburgh, a contract for a 1-story pattern storage building, 60 x 300 feet, G. W. Smith, Eighteenth avenue and Lake Erie railroad, Braddock, is general manager of the Sterling company.

CONNELLSVILLE, PA.—The Pennsylvania railroad, Pittsburgh, plans to erect a 1 and 2-story frieght station and office building, to cost about $40,000. D. T. Riffle, 1402 Keenan building, Pittsburgh, has been awarded the general contract.

EDDYSTONE, PA. — Baldwin Locomotive Works has let a contract for the erection of a foundry extension, 100 x 300 feet.

ELLWOOD CITY, PA.—The Ellwood City Water Co. plans to erect a reservoir. R. I. Burt is superintendent of the company.

ERIE, PA.—Pennsylvania railroad is about to erect a round house here.

ERIE, PA. — The Modern Tool Co. has plans for a large extension to its plant to be built early in the spring.

ERIE, PA.—The Erie City Iron Works plans to erect a 1-story cleaning room, 40 x 200 feet, to cost about $25,000. Rich, Irvin & Co., Erie, are preparing the plans.

JOHNSTOWN, PA. — The Conemaugh & Franklin Water Co. plans to build a filtration plant and dam, to cost about $125,000.

JOHNSTOWN, PA.—The Johnstown Traction Co. plans to build a line from Johnstown to New Florence, to cost about $300,000. E. M. Dupont is general manager.

JOHNSTOWN, PA.—The Morrellville & Cambria Water Co. plans to build a filter plant at F. street and Chandler avenue. H. C. Ramsey is superintendent of the company. Chester & Fleming, engineers, Pittsburgh, are in charge of the work.

McKEESPORT, PA.—The Peters Packing Co., 922 Rose street, has awarded G. Blair, 215 Sixth street, a contract for a fertilizer plant, to cost $30,000.

MIDLAND, PA.—The Crucible Steel Co. has awarded Cook & Andersen, Beaver, Pa., a contract for a 1-story and basement emergency hospital, 34 x 40 feet, F. J. Merrick, 1007 Empire building, Pittsburgh, is preparing the plans.

OIL CITY, PA.—The Pennsylvania railroad

plans to construct a steel and concrete bridge over the Allegheny river, to cost about $2,300,000. The bridge will require about 3,000 tons of steel.

PITTSBURGH.—Hotel Schenley plans to build an addition, to cost about $500,000. Rutan & Russell, Magee building, are preparing the plans.

PITTSBURGH.—Page Bros. & Co. plan to build a 2-story storage building, 50 x 225 feet, to cost about $50,000. Paul Irwin, Renshaw building, is preparing the plans.

PITTSBURGH. — The Baltimore & Ohio railroad has awarded the H. Shenk Co., Century building, a contract for a warehouse, to cost about $200,000.

PITTSBURGH.—The Jackson Motor Supply Co. plans to build a 3-story plant at Baum boulevard, South Negley avenue and Roup street, East End.

PITTSBURG.—The E. E. Reick Co. has been granted a permit to build an addition to its plant on Forbes street, to cost about $51,000.

PITTSBURGH. — The Standard Sanitary Mfg. Co. has awarded the Faber Engineering & Construction Co., Bessemer building, a contract for three enameling furnaces.

PITTSBURGH. — The Electro Pneumatic Gear Shift Corporation, recently organized, plans to build a plant. M. F. Metcalf, Pittsburgh, is president of the company.

PITTSBURGH. — The Iron City Electric Co., 711 New Grant street, has purchased a site at Grant boulevard and Bedford avenue where the company plans to erect a warehouse and store building.

PITTSBURGH.—The R. D. Clark Candy Co. has awarded the Faber Engineering & Construction Co., Bessemer building, a contract for an addition to its plant, to cost about $50,000.

PITTSBURGH.—The Schenley Farms Co., 201 Tennyson street, has awarded D. T. Riffle, 1402 Keenan building, a contract for a 4-story and basement garage and salesroom, 50 x 130 feet, to cost $80,000. Rutan & Russell, Magee building, prepared the plans.

READING, PA.—Carpenter Steel Co. has let a contract for extensions and alterations to building No. 29.

WILSON, PA.—The Morris & Bailey Steel Co. has awarded the McClintic-Marshall Co., Oliver building, Pittsburgh, a contract for three additions, 100 x 320, 60 x 210 and 40 x 300 feet, respectively, to cost about $75,000.

YORK, PA.—The Crescent Ice & Coal Co., Fifty-second street, Philadelphia, has awarded H. Voight, 1251 North Twenty-eighth street, a contract for a plant, to cost about $30,000.

ALLIANCE, O.—The Buckeye Twist Drill Co. has increased its capital from $150,000 to $1,000,000 to provide for extensive additions to its plant.

CANTON, O.—C. W. Krieg, secretary of the Berger Mfg. Co., states company has increased its capital stock from $5,000,000 to $10,000,000 and that extensive additions and improvements to the plant will be made.

CINCINNATI.—The Cincinnati Horseshoe & Iron Co., at Hooven, near Cleves, has purchased three acres adjacent to the plant and expects to double its capacity. The company also plans to build a number of homes for its employes.

CLEVELAND.—The National Tool Co. has been incorporated with $1,860,000 capital by R. C. Morrison, F. H. Pelton, S. J. Kornhauser, F. W. Treadway and W. H. Marlatt.

CLEVELAND. — The Cleveland Wrought Washer Co. has applied for a permit to erect a $40,000 factory at West Fifty-eighth street and Dennison avenue.

CLEVELAND. — The Air Reduction Sales Co. is negotiating through the Schauffler Realty Co. for a factory site on West Sixty-ninth street, on which it plans to erect a $75,000 plant.

CLEVELAND.—C. M. McLaren, president of the McLaren Iron Works, states that plans are ready for a new factory and office building to cost $30,000. The structure will be 1 and 2 stories, 60 x 200 feet and 30 x 66 feet.

COLUMBUS, O.—The Columbus Depot Co. has been granted a permit to construct tracks and switches and to build a depot over Wall street. It is estimated that the exposition building, a part of the project, and the depot will cost $1,500,000. Bids for the construction of the depot will be taken in March.

DAYTON, O.—The Dayton Rubber Mfg. Co., J. A. McNillan, president, has arrangements completed for an extensive addition to its present plant.

DAYTON, O.—Architects Shenck and Williams have completed plans for a factory building for F. P. Beaver, 215 West Second street. The structure will be two stories and basement, 50 x 200 feet.

EAST LIVERPOOL, O. — The Crucible Steel Co. has started a foundation for a new $75,000 foundry building at Midland, Pa.

KENTON, O.—The G. R. Wilmoth Co. has been incorporated as founder with $12,000 capital, by G. R. and A. E. Wilmoth, J. C. Ruech Jr., and W. H. Grimer Jr.

LIMA, O.—The Lima Metals Foundry Co. has been incorporated with $15,000 capital by W. J. Noonan, A. G. Bush, Sol Weisenthal, Ben Rhodes and John Thomas.

MIDDLETOWN, O.—The American Rolling Mill Co. plans to build an office and administration building to cost about $100,000. Werner & Adkins 1206 Mercantile Library building, Cincinnati, are preparing the plans.

STEUBENVILLE, O. — The Steubenville Steel Tie Co., recently organized, is preparing plans for the erection of a plant to be located in this city. L. L. Griene is president of the company.

YOUNGSTOWN, O.—The Youngstown & Suburban Railroad Co. plans to construct a double track, to extend from South Side park to Kyles corners.

CABIN CREEK, W. VA. — The Cabin Creek Refining Co., controled by the Ohio Cities Gas Co., Columbus, O., has awarded Putnam & Foreman a contract for building a plant, to cost about $200,000.

CHARLESTON, W. VA. — The Kanawha Banking & Trust Co. plans to erect a 9-story and basement bank and office building, 48 x 80 feet, to cost about $200,000. Dennison & Hirons, 475 Fifth avenue, New York City, are preparing the plans.

CHARLESTON, W. VA.—The board of education plans to build a 3-story and basement grade school, to cost about $35,000. James L. Montgomery, 403 Coyle & Richardson building, is preparing the plans. Harold Truith is president of the board of education.

EAST MORGANTOWN, W. VA. — The Chesapeake & Ohio railroad plans to extend its line at West Huntington. F. I. Cabell, Richmond, is chief engineer.

FAIRMONT, W. VA.—The city has voted $760,000 bonds to build two bridges over the Monongahela river, to cost about $350,000. S. B. Miller is city engineer.

HUNTINGTON, W. VA. — The city is making plans for a bridge over the Ohio river. A. B. Maupin is city engineer.

HUNTINGTON, W. VA. — The Standard Stamping Co. plans to erect a 1-story factory, 200 x 200 feet, to cost about $50,000. E. N. Alger, 608 R. & P. building, is preparing the plans.

HUNTINGTON, W. VA. — Cabel county court is receiving bids for constructing superstructure of Four Pole bridge, to cost about $50,000. Oliver and Maupin are the county engineers.

HUNTINGTON, W. VA.—Peerless Overall Co., Twentieth street and Second avenue, has awarded R. Smith, 319 R. & P. Park building, a contract for erecting a factory, to cost about $25,000.

MORGANTOWN, W. VA.—The West Virginia University plans to build a women's dormitory, to cost about $100,000. Paul A. Davis, 1713 Samson street, Philadelphia, Pa., is preparing the plans.

MORGANTOWN, W. VA.—The University of West Virginia is receiving bids on 4-story buildings, 46 x 180 feet and 60 x 150 feet, to cost about $300,000. P. A. Davis, 1713 Sanson street, Philadelphia, is preparing the plans.

PARKERSBURG, W. VA.—The Standard Oil Co. plans to improve its plant in East End, to cost about $125,000.

WHEELING, W. VA.—The Wheeling Corrugating Co., Arlington street and Campbell avenue, plans to build a warehouse, to cost about $200,000.

WHEELING, W. VA. — The Whitaker-Glessner Co., has awarded the Foundation & Riverside Bridge Co., a contract for building a factory on Wetzel street, to cost about $200,000.

LOUISVILLE, KY. — Purchase by Vogt Bros. Mfg. Co. of the plant and business, equipment, stock, etc., of Huetteman & Cramer Mfg. Co., Detroit, Mich., has been announced. The Detroit plant will be moved to Louisville and the purchasers will engage in manufacture of ice machinery.

OWENSBORO, KY.—The Hull Pump & Tank Co. has increased its capital from $100,000 to $200,000. J. W. McCulloch is president.

OWENSBORO, KY.—The Murphy Chair Co., Detroit, has accepted the offer of free power and free water for three years, purchased a plant and will establish its factory in Owensboro.

VERSAILLES, KY.—The city is planning a new pumping station, including two triplex pumps, two oil engines, compressors, motors and cast iron pipe, at a cost of $20,000. H. C. Taylor is mayor.

WILLIAMSBURG, KY.—Bids will be received in January on a 300-foot and a 105-foot bridge in Whitley county. B. F. Rose is county judge.

EAST CHICAGO, IND.—The E. B. Lanman Co. has been incorporated to manufacture nuts, bolts and specialties, with $20,000 capital stock, by H. A. Lanman, C. Seddon, and E. B. Lanman.

INDIANAPOLIS.—The Oakes Co., manufacturer of automobile parts, has increased its capital stock from $250,000 to $450,000.

INDIANAPOLIS.—The Ferguson Mfg. Co. has been incorporated to manufacture agricultural machinery, with $50,000 capital stock, by L. Rentz, W. M. Ferguson, and W. Rentz.

INDIANAPOLIS.—The American Safe Co. has been incorporated to manufacture vaults and safes with $25,000 capital stock by Henry Schmidt, M. G. Reynolds, and J. C. Groble.

INDIANAPOLIS. — The Burkhardt Motor Co. has been incorporated to manufacture engines, with $10,000 capital stock by L. Burkhardt, N. H. Wible and Alexander Burkhardt.

INDIANAPOLIS.—The National Motor & Vehicle Corporation, recently incorporated, with $5,000,000 capital stock, has taken over the National Automobile Co. and will build additions.

INDIANAPOLIS.—The Just Right Candlestick Co. has been incorporated to manufacture metal novelties with $10,000 capital stock by H. C. Schmidt, Johan Hanson, and J. McNamara.

LA PORTE, IND.—The U. S. Slicing Machine Co. has been incorporated to manufac-

ture meat slicing machines, with $1,000,000 capital, by E. E. Gore, G. V. Irving and J. C. Woodington.

PORTLAND, IND. — The Portland Body Works, manufacturer of automobile bodies, will build a 3-story factory costing $15,000.

RICHMOND, IND. — The National Automatic Tool Co. will build a second addition to its plant for storage and painting of castings.

SALEM, IND.—The Stout Furniture Co.'s plant was damaged to the extent of $300,000 by fire. Plans for reconstruction are progressing.

TERRE HAUTE, IND. — The Standard Wheel Co. is preparing to build a malleable foundry.

WALKERTON, IND.—The C. R. Folsom Iron Works, Inc., has been incorporated to manufacture tanks and other metal products, with $35,000 capital stock by William Endly, V. W. Hardenbrook, and Oscar Schockney.

CHICAGO.—The Acme Steel Goods Co., 2834 Archer avenue, will build an addition 94 x 99 feet, costing $15,000.

CHICAGO.—The Chicago Malleable Castings Co. will build a 2-story plant at 1219 West 120th street, costing $15,000.

CHICAGO. — H. Nelson, 569 West Van Buren street, is building a 2-story machine shop, 52 x 125 feet, costing $25,000.

CHICAGO.—The Aldon Co., railroad supplies, will build a 1-story factory 50 x 110 feet, costing $10,000. R. G. Pierce, 10 South LaSalle street, is architect.

CHICAGO.—The Industrial Mfg. Co., Clinton and Jackson streets, will build a 1-story factory at 408 Sacramento boulevard, costing $10,000.

CHICAGO.—The Metal Ware Corporation has been incorporated with $20,000 capital stock by George Theimer, Frank V. Cowan and Arnold Teschner, 7157 Dobson avenue.

CHICAGO.—The Acme Valve Co. has been incorporated with $15,000 capital stock by Charles I. Cobb, Roy W. Hill and John W. Hill, 53 West Jackson boulevard.

CHICAGO.—The Star Brass Works, 319 North Albany avenue, Edward W. Peterson, secretary, has let the contract for a plant 100 x 198 feet, on Carroll avenue between Kedzie & Albany avenues.

CHICAGO.—The Giant Truck & Wheel Corporation, 10 South LaSalle street, has been incorporated with $2,500 capital stock by Arthur L. Richtmyre, C. S. Wheeler, and Otto G. Ryden.

CHICAGO.—The Appleby Hinge Mfg. Co. has been incorporated with $2,500 capital stock by Daniel S. Gillespie, William K. Appleby and W. A. Jennings, 69 West Washington street.

CHICAGO.—The Pittsburgh Building Co., 39 South LaSalle street, will build a 1-story and 2-story plant and office building, 85 x 100 feet, 40 x 50, and 25 x 36 feet. Mundie & Jensen, 39 South LaSalle street, are architects.

DIXON, ILL.—The Illinois Northern Utilities Co. plans to build a power plant at Dixon, costing $280,000. H. H. Heinze, Dixon, is purchasing agent.

DUNDEE, ILL.—The city of Dundee plans to build a concrete bridge at Main street, 240 feet long, with 40-foot roadway, creosoted block pavement. George N. Lamb is general superintendent of highways.

ROCKFORD, ILL. — The Rockford Tool Co. has increased its capital stock from $50,000 to $100,000.

BELOIT, WIS.—Joseph Sairs will build a 2-story factory 50 x 160 feet for the manufacture of automobile specialties and brake linings.

GRAND RAPIDS, WIS.—The county is preparing to build a bridge costing $60,000 over the Wisconsin river during 1917.

MANITOWOC, WIS. — The Wisconsin Aluminum Foundry Co. is building an addition to its plant.

MANITOWOC, WIS.—The Hoffman Glove Co., Eighteenth and Franklin streets, has awarded contracts for the erection of a new factory costing $20,000, with individual electric motor drive throughout.

MILWAUKEE.—A. H. Karrer Co., manufacturer of surgical instruments, is planning to build a 4-story factory 20 x 127 feet.

MILWAUKEE. — The Progressive Metal Co., Washington and Barclay streets, plans to build a 2-story addition 40 x 160 feet.

MILWAUKEE. — The American Grinder Mfg. Co., 2203 Sycamore street, has increased its capital stock from $25,000 to $100,000. L. E. Barteno is secretary.

MILWAUKEE—The American Household Supply Co. will build a reinforced concrete building, 5-story and basement, 50 x 120 feet at Fond du Lac avenue and Nineteenth street, costing $85,000. It will be equipped with one electric freight and one electric passenger elevator.

ALLEGAN, MICH. — The Allegan Steel Process Co., a new corporation, is building a factory costing $30,000.

DETROIT. — The Gabriel Reinforcing Co. will build a factory on Bellevue avenue, costing $18,000.

DETROIT.—The Michigan Wire Cloth Co. will build a factory on Wabash street, costing $30,000.

DETROIT. — The National Machine Producer Co. has been incorporated with $150,000 capital by William H. McGregor and others.

DETROIT. — Estimates of the cost of the Belle Isle bridge call for $2,000,000, and of a subway approximately $125,000. M. E. Cooley, University of Michigan, is chairman of the board of consulting engineers.

DETROIT.—Buhl Sons & Co. will build a steel warehouse, 4 stories, 30 x 402 feet, a crane building 80 x 402 feet, a storage building 65 x 402 feet, and a dock 480 feet long. John Scott & Co., 2326 Dime Bank building, are architects. Arthur H. Buhl, 123 W. Woodbridge avenue, is general manager.

LANSING, MICH.—The Novo Engine Co. will build a 1-story foundry costing $50,000. H. E. Smith, Lansing, is architect.

LANSING, MICH.—The Lansing Stamping & Tool Co. has increased its capital from $40,000 to $100,000, and will build additions.

LANSING, MICH.—The Duplex Truck Co., recently incorporated with $1,000,000 capital has taken over the plant of the Duplex Power & Car Co. at Charlotte, Mich., and will move to Lansing where a new plant will be built. H. M. Lee is president and general manager.

MUSKEGON, MICH. — The Continental Motors Co. is planning to enlarge its drop forge plant and to install several additional hammers.

DULUTH.—The Hikawa Iron Co. has been incorporated with $200,000 capital by W. A. Hicken, Thomas A. Walker and Frank Krassweiller.

MARSHALL, MINN.—The city of Marshall plans to build a water works system costing $500,000. O. H. Stark is engineer.

ROCHESTER, MINN. — Bids will be received in January for a hydro-electric power plant for the city costing $500,000. H. D. Cooper, 101 Park avenue, New York, is engineer.

ST. PAUL.—The Johnson Mfg. Co., manufacturer of printing machinery, 520 Bradly street, is building a factory.

JOPLIN, MO.—Bonds for $175,000 have been voted for an electric light plant.

MACON, MO.—The All Steel Motor Car Co. will build a 3-story factory 150 x 175 feet.

ST. LOUIS.—The Magnet Mfg. Co., newly incorporated, will equip a plant immediately for the manufacture of electric switch boxes.

ST. LOUIS.—The Beaker Mfg. Co. has been incorporated to manufacture metal products, with $10,000 capital, by Guy Golterman, E. C. Koening, and O. Keiser.

ST. LOUIS.—The Williams Boltless Rail Joint Co., an Arizona corporation, has established headquarters in St. Louis, and plans to build a plant costing $50,000.

ST. LOUIS. — The Western Foundry & Sash Weight Co. will build additions costing $12,000. Ernest H. Hess, 3226 Magnolia avenue, is architect.

ST. LOUIS.—The Modern Brass Foundry Co. has been incorporated to manufacture brass and bronze devices, with $3,000 capital by Carl G. Strotz, John P. Hill and Louis C. Strotz.

UNIONVILLE, MO.—Putnam county has voted $100,000 for bridges.

WEBB CITY, MO.—Webb City and Carterville, are planning a steel bridge 2,100 feet long, to connect the towns. L. E. Briggs is city engineer of Webb City.

CEDAR FALLS, IA.—The Universal Hoist Co. is building a 3-story factory.

FT. DODGE, IA.—Bids will be received about Jan. 1 on bridges for Webster county, to cost $30,000. J. L. Parsons is engineer.

HAMPTON, IA.—Plans are under way for five steel bridges. Al G. Baker is county engineer.

INDEPENDENCE, IA.—Bids will be received until Jan. 9 by W. H. Wilson, mayor, for material and equipment for a complete waterworks system.

South of the Mason-Dixon

WASHINGTON.—Capitol Construction Co. has let a contract for the erection of a 2-story, 20 x 120-foot automobile repair shop addition.

BIRMINGHAM, ALA.—The Kilby Frog & Switch Co. has increased its capital stock from $150,000 to $200,000, and will build an addition 30 x 300 feet.

JOHNSON CITY, TENN. — The electric power house, saw mill and other departments of the Tennessee Lumber & Veneer Co., damaged by fire to the extent of $100,000, will be rebuilt.

NASHVILLE, TENN.—Fire damaged the dry plant of the Tennessee Extract Co., to the extent of $80,000.

ALTO, TEX. — The Alto Light & Power Co. will rebuild its electric light plant which was recently burned.

DALLAS, TEX. — The Gulf, Colorado & Santa Fe railroad will build two overhead crossings in Dallas. H. D. Lindsley is mayor.

DALLAS, TEX.—The Missouri-Kansas & Texas railroad is to eliminate grade crossings and double track its lines in the city.

Mississippi to the Rockies

CASTLEWOOD, S. D.—Plans are being prepared for a water works system costing $20,000. Freed & Sours, Watertown, Wis., are engineers.

DELL RAPIDS, S. D.—Bonds for $40,000 have been voted for an electric light system.

OMAHA, NEB.—The Northwestern-Pacific Belt Line plans to elevate its tracks in West Omaha at a cost of $200,000. E. A. Hadley, St. Louis, is chief engineer.

DILLON, MONT.—The Oregon Short Line railroad, it is reported, will make this a division point and is after ground on which to erect shops. The Northern Pacific and Gilmore & Pittsburg railroads will purchase grounds here for joint depot and yards.

BEGGS, OKLA.—The city plans to build a water works system including reservoir and stand pipe to cost $42,000. C. I. Brane is city clerk.

OKLAHOMA CITY, OKLA.—The Stewart Mfg. Co. has been incorporated with $50,000 capital by J. G., M. B., and M. E. Stewart.

OKLAHOMA, OKLA. — Oklahoma county will let a contract soon for 20 steel bridges to cost $35,000. H. Adams of Oklahoma, is county engineer.

OKLAHOMA, OKLA. — The Southwestern Power, Light & Railroad Co. is about to sell $1,000,000 worth of bonds to provide for five hydro-electric plants on the Washita river.

OKMULGEE, OKLA. — The United Iron Works will build additions to its machine shop and boiler shop at a cost of about $35,000.

TULSA, OKLA.—The Oklahoma Structural Steel Co. has been incorporated with $10,000 capital stock by J. W. Sloan, D. M. Iverson and E. A. Shaw.

TULSA, OKLA. — The Drane-Owen Tank Co. has been incorporated with $25,000 capital stock by F. M. Drane and C. A. Mechling, of Tulsa.

DENVER.—The Jackson Compressor Co., 1130 Twelfth street, is planning to build a new plant, including a shop 65 x 256 feet, two stories, boiler room and pattern shop, 30 x 122 feet, forge shop 30 x 120 feet, lathe shop 65 x 256 feet, equipped with two 25-ton cranes.

The Pacific Coast States

NORTH YAKAMA, WASH.—Bids will be received until Jan. 6 by Charles Barrett, county auditor, for a 50-foot span bridge over Satus Creek.

OLYMPIA, WASH. — Olympia Light & Power Co. will install a 1,000 horsepower auxiliary steam plant to cost about $40,000.

SEATTLE. — The Puget Sound Boiler Works is building a 1-story addition.

SEATTLE.—The Washington Iron Works will build an addition 48 x 72 feet.

SEATTLE.—H. D. Stewart, American Bank building has been awarded the contract by Ames Ship Building & Dry Dock Co. for machine shop 95 x 240, furnace, blacksmith and coppersmith sheds each 50 x 120, etc.

SEATTLE.—Bids are to be requested at once for furnishing the equipment for the proposed $350,000 auxiliary steam plant of the lighting system. Following divisions are included: Boiler feed pumps; steam turbo generator, exciter, high vacuum set condenser, air and water pumps, etc.

CANBY, ORE.—Bonds for $18,000 have been voted for a municipal water works plant.

MARSHFIELD, ORE.—It is reported that Southern Pacific railroad will soon begin improvements here, including yard facilities, freight depot, docks, etc., to cost $500,000.

PORTLAND, ORE.—Plans for the second unit of the Albina Engine & Machine Works have been completed and construction is to start at once. The building will be of frame construction 63 x 525 feet.

RIDDLE, ORE.—Bonds for $20,000 have been voted for a water works and electric light system.

LOS ANGELES.—The Western Metals Co. will build a 1-story plant 17 x 96 feet, at Belle Port avenue, Harbor City.

PORTERVILLE, CAL. — The Magnesite Refractories Co. has been incorporated to build a reduction plant, with $200,000 capital, by J. L. Mitchell, of Porterville, E. J. Heinor and Charles B. Stetson, of San Francisco.

The Dominon of Canada

LAVAL DE MONTREAL, QUE.—Bigonesse & Bigonesse, 60 Notre Dame street, East, Montreal, Que., are preparing plans for the erection of a factory for the Dominion Aircraft & Mfg. Co., at Laval de Montreal. The building will be of reinforced concrete and plastic brick construction and will cost $20,000. W. H. Parker, 101 St. Luke street, Montreal, is manager of the company.

SHERBROOKE, QUE.—E. C. Gatien, secretary of the city council, is in the market for a 4-ton hand operated traveling crane.

MIMICO, ONT.—The Dominion Abrasive Wheel Co. has commenced the erection of a plant at Mimico to cost $75,000. A large amount of new machinery will be installed in the plant.

OWEN SOUND, ONT. — The Northern Bolt, Screw & Wire Co., Ltd., has been incorporated with $50,000 capital to manufacture nails, bolts, dies, machinery, etc., by John McEwen, J. M. Kilbourn, president; Clarence L. Van Dyke and others, all of Owen Sound. It is the intention of the company to greatly increase the capacity of its Owen Sound plant and to conduct its business on a much larger scale. A new keg mill 50 x 100 feet will be erected, in addition to extensions to the main plant.

RENFREW, ONT.—Mr. Low has commenced the erection of a machine shop at Renfrew estimated to cost $12,000.

SARNIA, ONT.—The Sarnia Metal Products Co., 309 Front street, will commence next spring on the erection of a large addition to its plant.

SASKATOON, SASK.—The Adams Brothers Harness Mfg. Co., McDermott avenue East, Winnipeg, Man., is having plans prepared for the erection of a factory at Saskatoon to cost $125,000.

VANCOUVER, B. C. — Vancouver Dry Docks Co., Chas. Meek, president, will construct dry dock capable of handling boats of 18,000 tons, ship building plant, repair shed, etc. Bonds for $2,000,000 have been sold.

VANCOUVER, B. C.—Gardiner & Mercer, Birks building, are preparing plans for a ship building plant to be erected at Vancouver for the Vulcan Iron Works to cost $350,000. Tenders will be called in the near future.

VICTORIA, B. C. — The Aetna Iron & Steel Co. has been formed to erect a plant at Victoria to manufacture angle and T-iron; merchant bars will later be turned out. As soon as possible the smelting of iron ores to supply the requirements of the plant will be taken up. Structural steel will also be manufactured. The output of the plant at the start will have a daily capacity of 40 tons. Joshua Kingham, David Milne, Lt.-Col. Angus, Geo. H. Robertson and others of Victoria are the organizers of the company.

New Catalogs

FLEXIBLE SHAFTING.—The Stow Mfg. Co., Binghamton, N. Y., recently issued a 110 page catalog describing flexible shafting, and showing the varied line of manufacture in which it may be employed. The catalog also contains tables of prices and dimensions. Several pages are devoted to electric tools, motors and special machinery.

TOOLHOLDER.—A folder has been issued by the Universal Tool Mfg. Co., Poughkeepsie, N. Y., describing a toolholder which is said to be adapted for many different kinds of tools. It is claimed that this toolholder grips tools designed for setting, centering, drilling, boring, facing, reaming, tapping and other operations.

MOTOR DRIVEN HAMMERS.—A booklet describing and illustrating motor-driven hammers has been published by Beaudry & Co., Inc., Boston. Hammers are built in two different types, in sizes from 25 to 500 pounds. These motor hammers are designed for general blacksmithing, swaging collaring, drawing, plating, spindle making, etc. It is claimed that they will handle varying thicknesses of stock without change of adjustment. Complete specifications are tabulated in the booklet.

STEEL FILING CASES. — A folder describing steel drawing cases and filing cabinets has been issued by the Economy Drawing Table Co., Toledo, O. Drawing tables are furnished by the company in several different styles. Their tops are made of soft pine and they are equipped with numerous drawers and compartments. The dimensions of the table are 84 x 39 inches by 35 inches in height. The filing cases are especially designed for blue prints and contain 10 large drawers. Wire springs to hold down the prints and to prevent their catching in the sides when the door is opened or closed are furnished as extras. All joints of the case are electrically welded.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

Bessemer valley	$35.00
Bessemer, Pittsburgh	35.95
Basic, Pittsburgh	30.95
Basic, eastern Pa.	30.50 to 31.00
Basic, Buffalo	35.00
Malleable, Pittsburgh	31.95 to 33.95
Malleable foundry, Chicago	30.00 to 31.00
Malleable foundry, Philadelphia	32.00 to 33.00
Malleable foundry, Buffalo	35.00
No. 1X foundry, Philadelphia	31.00 to 31.50
No. 2 foundry, Pittsburgh	31.95 to 33.95
No. 2 foundry, Cleveland	30.30 to 31.30
No. 2 foundry, Ironton	30.00
No. 2 foundry, Chicago	30.00 to 31.00
No. 2X foundry, Philadelphia	30.00 to 31.00
No. 2X foundry, N. J. tidewater	30.00 to 31.00
No. 2X foundry, Buffalo	35.00
No. 2 plain, Philadelphia	29.50 to 30.00
No. 2 plain, N. J. tidewater	29.50 to 30.00
No. 2 plain, Buffalo	35.00
No. 2 southern, Birmingham	23.00 to 25.00
No. 2 southern, Cincinnati	25.90 to 27.90
No. 2 southern, Chicago	27.50 to 28.00
No. 2 southern, Phila. delivery	28.00 to 30.00
No. 2 southern, Cleveland	27.50 to 29.00
No. 2 southern, New York docks	28.25 to 30.25
No. 2 southern, Boston docks	28.00 to 30.00
No. 2 south. interior, New Eng.	29.00 to 31.00
No. 2 southern, St. Louis	
Virginia, No. 2X furnace	26.00 to 28.00
Virginia, No. 2X, Philadelphia	28.75 to 30.75
Virginia, No. 2X, Jersey City	29.00 to 31.00
Virginia, 2X, Boston points	29.25 to 31.25
Gray forge, eastern Pa.	29.00 to 29.50
Gray forge, Pittsburgh	30.95
Gray forge, Birmingham	22.00
Silveries, 8 per cent, furnace	36.00 to 37.00
Silveries, 8 per cent, Chicago	38.50
Low phos. Standard, Phila.	54.00 to 56.00
Low phos. Lebanon, Pa., furnace	50.00 to 55.00
Low phos., Pittsburgh	50.00 to 51.00
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	33.75 to 34.75
Charcoal, Buffalo	24.00 to 27.00
Charcoal, Birmingham	26.00 to 27.00

IRON ORE

Lake Superior Ores.
(Lower Lake Ports.)

Old range Bessemer, 55 per cent, ton	5.95
Mesabi Bessemer, 55 per cent, ton	5.70
Old range non-Bes., 51½ per cent, ton	5.20
Mesabi non-Bess., 51½ per cent, ton	5.05

Port Henry Ores.
(Per unit delivered eastern Pa.)
(All non-Bessemer.)

Old Bed, crude, 58 per cent	10.50c to 11.00c
Old Bed, concent., 65 per cent.	11.00c to 11.50c
Harmony concent., 63 per cent.	11.50c to 11.75c
Lump (at mines)	$5.75

Foreign Ores.
(Per unit, Philadelphia.)

Foreign Bess., 50 to 65 per cent	nominal
For'n non-Bess., 50 to 65 per cent	nominal

COKE

(At the ovens.)

Connellsville furnace	$8.75 to 9.50
Connellsville furnace, contract	8.00
Connellsville foundry, contract	6.50 to 6.75
Connellsville foundry	10.00 to 11.00
Wise county furnace, contract	5.00 to 5.50
Wise county foundry, contract	6.00 to 7.50
Pocahontas foundry, contract	6.00 to 7.50
Pocahontas furnace, contract	5.00 to 5.50
New River foundry, contract	6.25 to 7.75
New River furnace, contract	5.25 to 5.75

FERRO ALLOYS AND STEEL MAKING METALS

Ferro manganese, 80 per cent, seaboard, or delivered prompt	$164 to 175
Ferro manganese, 80 per cent, seaboard, or delivered, contract	164 to 175
Spiegel, 20 per cent, fur. early and last half	55.00 to 60.00

Ferro-silicon, 60 per cent, Pbg. 95.00 to 100.00

Bessemer ferro-silicon, 9 per cent to 10 per cent, $4100; 10 to 11 per cent, $42.00; 11 to 12 per cent, $43.00; 12 to 13 per cent, $44.00 a ton at the furnace at Ashland, Jackson and New Straitsville, O.

Ferro-carbon titanium, 8 to 12½ cents per pound in carloads.

SEMI-FINISHED MATERIAL

Open hearth billets, Phila.	$55.00 to 60.00
Forging billets, Phila.	75.00 to 85.00
Forging billets, Pbgh., nominal	75.00 to 85.00
Forging billets, Chicago	70.00
Wire rods, Pittsburgh	75.00 to 80.00
Bessemer billets, Youngstown	60.00 to 65.00
Bessemer billets, Pittsburgh	60.00 to 65.00
Open hearth billets, Pittsburgh	60.00 to 65.00
Open hearth billets, Youngstown	60.00 to 65.00
Bess. sheet bars, Youngstown	60.00 to 65.00
Op. h'th sheet bars, Youngstown	60.00 to 65.00
Bess. sheet bars, Pittsburgh	60.00 to 65.00
Open hearth sheet bars, Pbgh.	60.00 to 65.00
Muck bars, Pittsburgh (nominal)	50.00

SKELP

Grooved steel skelp	3.00c to 3.10c
Sheared steel skelp	3.50c to 3.60c

RAILS AND TRACK MATERIAL

(Gross tons.)

Stand. Bess. rails, Pbgh. & Chgo.	$38.00
Stan. op-h'th rails, Pbgh. & Chgo.	40.00
Light rails, 8 to 10 lbs., Pbgh.	53.00
Light rails, 8 lb., Chicago	49.00
Light rails, 12 to 14 lbs., Pbgh.	52.00
Light rails, 12 lbs., Chicago	47.00
Light rails, 16 to 20 lbs., Pbgh.	51.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	2.98
Boston	3.18
Philadelphia	2.78
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York ad Brooklyn (by canal)	1.25 to 1.60
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York (r. and w.)	4.25
Philadelphia (all rail)	5.20
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

Light rails, 16 to 20 lbs., Chgo.	$46.00
Light rails, 25 to 45 lbs., Pbgh.	50.00
Light rails, 25 to 45 lbs., Chgo.	45.00
Relaying rails, standard, Pbgh. and Chicago	$33.00 to 34.00
Relaying rails light, Chicago	34.00 to 35.00
Angle bars, st. sect., Pbgh. base	2.25c to 2.75c
Angle bars, st. sections, Chgo.	2.25c to 2.75c
Spikes, railroad, Pittsburgh	3.40c
Spikes, railroad, Chicago	3.50c
Track bolts, Pittsburgh	4.50c to 5.00c
Track bolts, Chicago	4.25c to 4.50c
Tie plates, Chicago	$55.00 to 60.00

SHAPES, PLATES AND BARS

Structural shapes, con. Pbgh.	3.10c
Structural shapes, Pbgh.	3.10c to 3.25c
Structural shapes, Philadelphia	3.159c to 3.659c
Structural shapes, Chicago	3.19c to 3.75c
Structural shapes, New York	3.169c to 3.669c
Tank plates, Chicago	3.79c to 4.25c
Tank plates, Pittsburgh (con)	3.60c to 4.00c
Tank plates, Pittsburgh	4.50c to 5.00c
Tank plates, Philadelphia	3.909c to 4.659c
Tank plates, New York	3.919c to 4.669c
Bars, soft steel, Chicago	3.09c to 3.50c
Bars, soft steel, Pbgh. (con.)	3.00c
Bars, soft steel, Pittsburgh	3.00c to 3.25c
Bars, soft steel, New York	3.169c to 3.419c
Bars, soft steel, Philadelphia	3.159c to 3.409c
Hoops, carloads, Pbgh. contr.	3.50c
Hoops, Pbgh.	4.00c to 4.25c
Bands, Pittsburgh	3.90c to 4.10c
Bands, Pittsburgh (contr.)	3.00c
Shafting, Pbgh., contr. carloads	10 to 20 off
Bar iron, Chicago	3.00c
Bar iron, Philadelphia	3.159c
Bar iron, Cleveland	3.00c
Bar iron, New York	3.159c
Bar iron, Pittsburgh	3.25c
Hard steel bars, Chicago	3.00c

SHEETS

(In cents per pound).
(Open hearth material takes 10c above prices of bessemer.)

SHEET MILL BLACK.

Gage.	Bessemer.
17 to 21	4.30 to 5.30
22 to 24	4.35 to 5.35
25 and 26	4.40 to 5.40
27	4.45 to 5.45
28	4.50 to 5.50
29	4.55 to 5.55
30	4.65 to 5.65

TIN MILL BLACK.

Gage.	Bessemer.
15 and 16	4.30 to 5.30
17 to 21	4.35 to 5.35
22 to 24	4.40 to 5.40
25 to 27	4.45 to 5.45
28	4.50 to 5.50
29 and 30	4.55 to 5.55
30½ and 31	4.60 to 5.60

GALVANIZED.

Gage.	Bessemer.
10 and 11	5.50 to 6.50
12 to 24	5.60 to 6.60
15 and 16	5.75 to 6.75
17 to 21	5.95 to 6.95
22 to 24	6.00 to 7.00
25 and 26	6.20 to 7.20
27	6.35 to 7.35
28	6.50 to 7.50
29	6.70 to 7.70
30	6.95 to 7.95

BLUE ANNEALED.

Gage.	Bessemer.
3 to 8	4.00 to 4.75
9 to 10	4.00 to 4.75
11 to 12	4.00 to 4.75
13 and 14	4.00 to 4.75
15 and 16	4.00 to 4.75

No. 28 black, Chicago	4.69c
No. 28 galvanized, Chicago	6.50c to 6.75c
No. 10 blue annealed, Phila.	4.159c to 4.659c
No. 10 blue annealed, Chicago	4.69c

TIN PLATE

Tin plate, 100 lb., coke base	7.00c to 8.00c
Terne plate	5.75c

IRON AND STEEL PIPE

(Prices adopted Dec. 30, 1916.)

Steel.

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
⅛, ¼ and ⅜, butt	57	30½
½, butt	61	46½
¼ to 3, butt	64	50½
2, lap	57	44½
2½ to 6, lap	60	47½
7 to 12, lap	57	43½
13 and 14, lap	47½	....
15, lap	45	....

Iron.

Standard weight, threads and couplings, diam. in inches.	Black. Per cent off.	Galv. Per cent off.
⅛ and ¼, butt	46	19
⅜, butt	47	20
½, butt	51	33
¾ to 1½, butt	54	38
1¼, lap	40	25
1½, lap	46	32
2, lap	47	33
2½ to 6, lap	49	36
7 to 12, lap	48	35

BOILER TUBES

Steel, 3½ to 4½ inches l. c. l.	46
Iron, 3½ to 4½ inches l. c. l.	36

IRON AND STEEL PRICES

Corrected up to Tuesday noon

WIRE PRODUCTS

(Adopted Nov. 24, 1916.)
(Retailers' price 5 cents above jobbers' quotations.)

Wire nails, jobbers', Pittsburgh	$3.00
Plain wire, jobbers', Pittsburgh	2.95
Galvanized wire, jobbers', Pbgh	3.65
Polished staples, Pbgh	3.15
Galvanized staples, Pbgh	3.85
Bard wire, painted, jobbers', Pbgh.	3.15
Barb wire, galv., jobbers,' Pbgh	3.85

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled thread, 40 and 10; cut threads, 40 and 2½, larger or longer, 30 and 5.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter rolled 50; cut, 40 and 10; larger or longer, 35 and 5.

Cold pressed, semi-finished hexagon nuts, 50, 10 and 5.

Gimlet and cone point lag bolts, 50. Hot pressed square nuts, blanks, $2.50 off; tapped $2.30 off. Hot pressed hexagon nuts, blank, $2.50 off; tapped, $2.30 off.

Cold pressed square nuts, blank, $2.10 off; tapped, $1.90 off. Cold pressed hexagon nut, blank, $2.25 off; tapped, $2.00 off.

RIVETS

Structural rivets, Pbgh	4.25c
Boiler rivets, Pbgh	4.35c

Tinner's rivets, 40 and 10 off, Pittsburgh.

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	3.00c

STANDARD STEEL CHAIN

Chain, ⅜ inch proof coil	6.00c

COLD ROLLED STRIP STEEL

Base price, 7.00c per 100 pounds, hard, coils 1½ inches and wider and by .100 inch and heavier.

CAST IRON WATER PIPE

Four-inch, Chicago	$44.00 to 45.00
Six-inch and larger, Chicago	41.00 to 42.00
Six-inch Class B, New York	41.50
Four-inch Class B, New York	44.50
Four to six-inch Birmingham	39.00
Six-inch and larger, Birmingham.	36.00

Light weight water and gas pipe $1 per ton higher than standard water.

WAREHOUSE PRICES

Steel bars, Chicago	3.75c
Steel squares, 2-in. & ov., Cleve.	4.25c
Steel rounds, 2-in & ov., Cleve.	4.25c
Steel bars, und. 2 in., Cleveland.	3.75c
Steel bars, Detroit	3.60c
Steel bars, Philadelphia	3.75c
Steel bars, New York	3.85c
Steel bars, St. Louis	3.80c
Steel bars, Cincinnati	3.80c to 4.35c
Steel bars, St. Paul	3.85c
Steel bars, over 2-in., Buffalo	4.50c
Steel bars, Buffalo	3.85c
Iron bars, Chicago	3.75c
Iron bars, Cleveland	3.70c
Iron bars, Detroit	3.60c
Iron bars, St. Louis	3.60c
Iron bars, Cincinnati	3.80c to 4.35c
Iron bars, Philadelphia	3.50c
Iron bars, New York	3.75c
Shapes, Chicago	3.85c
Shapes, Detroit	3.70c
Shapes, St. Louis	3.90c
Shapes, St. Paul	3.95c
Shapes, New York	3.95c
Shapes, Cleveland	3.85c
Shapes, Philadelphia	3.75c
Shapes, Buffalo	3.95c
Shapes and plates, Cincinnati	3.90c to 4.60c
Plates, Chicago	4.50c
Plates, Detroit	4.35c
Plates, St. Louis	4.55c
Plates, St. Paul	4.60c
Plates, New York, wide	5.00c
Plates, New York, narrow	4.75c
Plates, Cleveland	4.35c
Plates, Philadelphia	4.50c to 5.00c
No. 10 blue anl. sheets, Chicago	4.65c
No. 10 blue anl. sheets, Cleve.	4.50c
No. 10 blue anl. sheets, Cleveland	4.25c to 4.50c
No. 10 blue anl. sheets, Buffalo.	4.50c
No. 10 blue anl. sheets, St. L.	4.70c
No. 10 blue anl. sheets, Cinci.	4.60c
No. 10 blue anl. sheets, St. Paul	4.75c
No. 10 blue anl. sheets, Detroit	4.25c
No. 28 black sheets, Chicago	5.15c
No. 28 black sheets, Cleveland.	5.90c
No. 28 black sheets, Cincinnati.	4.75c
No. 28 black sheets, Detroit	4.75c
No. 28 black sheets, St. Louis.	5.20c
No. 28 black sheets, St. Paul	5.25c
No. 28 galv. sheets, Chicago	7.00c
No. 28 galv. sheets, Cleveland	7.00c
No. 28 galv. sheets, Cincinnati	7.00c
No. 28 galv. sheets, Detroit	7.00c
No. 28 galv. sheets, St. Louis	7.10c
Hoops, Cleveland	4.50c
Hoops, Detroit	4.25c

Coke Oven By-Products

Spot.

Per Gallon at Producers Plant.

Pure benzol	$0.55 to .60
Toluol	2.00 to 2.25
Solvent naphtha	.25

Per Pound at Producers Plant.

Phenol	$0.50 to .55

Per 100 Pounds at Seaboard.

Sulphate of ammonia	$4.10 to 4.12

Contract.

Per Gallon at Producers Plant.

Pure benzol	$0.55 to .60
Toluol	1.50 to 1.75
Solvent naphtha	.25

Per Pound at Producers Plant.

Phenol (nominal)	$0.55

Per 100 Pounds at Seaboard.

Sulphate of ammonia (nearby)	$4.10 to 4.12

IRON AND STEEL SCRAP

(Net Tons.)

Angle bars, iron, Chicago	$27.50 to 28.00
Angle bars, steel, St. Louis	20.00 to 20.50
Arch bars and transoms, St. L.	27.00 to 27.50
Arch bars and transoms, Chgo.	28.00 to 28.50
Cast, No. 1, St. Louis	19.50 to 18.00
Boiler plate, cut, No. 1, Chgo.	15.00 to 15.50
Boiler plate, cut, No. 1, St. L.	14.00 to 14.50
Boiler punchings, Chicago	21.00 to 22.00
Bundled sheet, Cincinnati	12.50 to 13.00
Busheling, No. 1, Chicago	17.00 to 17.50
Busheling, No. 1, Cincinnati	14.00 to 14.50
Busheling, No. 1, Cleveland	18.00
Busheling, No. 1, St. Louis	16.00 to 16.50
Busheling, No. 2, Chicago	12.50 to 13.50
Cast borings, Chicago	8.50 to 9.00
Cast borings, Cincinnati	7.50 to 8.00
Cast borings, Cleveland	9.25 to 9.50
Cast borings, St. Louis	8.00 to 8.50
Cast, No. 1, Chicago	15.50 to 16.00
Cast, No. 1, Cincinnati	15.50 to 16.00
Cast, No. 1, Cleveland	18.00 to 18.25
Cast, No. 1, St. Louis	16.00 to 16.50

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs.

to:—	
New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	83.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama canal	61.9 cents

Cut forge, Chicago	22.00 to 22.50
Grate bars, Cleveland	12.00 to 12.50
Iron axles, St. Louis	33.50 to 34.00
Iron axles, Cleveland	44.00 to 45.00
Knuckles, coup., Chicago	23.50 to 24.00
Knuckles, coup., St. Louis	24.00 to 24.50
Locomotive tires, Chicago	29.00 to 29.50
Locomotive tires, St. Louis	27.00 to 27.50
Machine shop turnings, Chicago	9.75 to 10.25
Machine shop turnings, Cleveland	9.00 to 9.25
Machine shop turn'gs, Cincinnati	8.00 to 8.50
Machine shop turnings, St. Louis	8.00 to 8.50
Malleable agricultural, Chicago	15.50 to 16.00
Malleable agricultural, St. Louis	15.00 to 15.50
Malleable, Cincinnati	12.50 to 13.00
Malleable railroad, Chicago	18.00 to 18.50
Malleable railroad, St. Louis	16.00 to 16.50
Pipes and flues, Cleveland	15.00 to 15.75
Pipes and flues, Chicago	14.50 to 15.00
Pipes and flues, St. Louis	15.00 to 15.50
Railroad wrought, No. 1, Cleve.	25.00 to 25.50
Railroad wrought, No. 1, Chgo.	24.50 to 25.00
Railroad wrought, No. 1, Cinci.	19.50 to 20.00
Railroad wrought, No. 1, St. L.	23.50 to 24.00
Railroad wrought, No. 2, Chgo.	22.00 to 22.50
Railroad wrought, No. 2, St. L.	22.50 to 23.00
Shafting, St. Louis	25.00 to 25.50
Springs, Chicago	24.00 to 24.50
Steel car axles, St. Louis	35.00 to 35.50
Steel car axles, Chicago	41.00 to 42.00
Stove plate, Chicago	12.50 to 13.00
Stove plate, Cleveland	12.25 to 12.75
Stove plate, Cincinnati	11.50 to 12.00
Stove plate, St. Louis	13.00 to 13.50

(Gross Tons.)

Axle turnings, Cleveland	$16.50 to 16.75
Axle turnings, Buffalo	17.50 to 18.00
Busheling, No. 1, Buffalo	21.50 to 22.00
Busheling, No. 1, Pittsburgh	18.50 to 19.00
Busheling, No. 2, Buffalo	15.00 to 15.50
Bundled sheets, Pittsburgh	16.00 to 16.50
Bundled sheets, Cleveland	14.50 to 15.00
Bundled sheets, Buffalo	15.00 to 16.00
Bundled tin, Buffalo	15.00 to 16.00
Car wheels, (iron), Pittsburgh	21.00 to 22.00
Car wheels, (steel), Pittsburgh	27.00
Car wheels, Chicago	20.00 to 20.50
Car wheels, eastern Pa.	22.50 to 23.50
Car wheels, Buffalo	23.00 to 24.00
Car wheels, New York	21.00 to 21.50
Car wheels, St. Louis	22.50 to 23.00
Car wheels, Birmingham	19.00 to 20.00
Car wheels, Cleveland	19.00 to 19.50
Tram car wheels, Birmingham	17.00 to 18.00
Cast borings, New York	11.50 to 12.00
Cast borings, eastern Pa.	13.50 to 14.00
Cast borings, Buffalo	11.50 to 12.00
Cast borings, Pittsburgh	12.00 to 13.00
Cast, No. 1, eastern Pa.	20.50 to 21.00
Cast, No. 1, Pittsburgh	20.00 to 21.00
Cast, No. 1, Birmingham	19.00 to 20.00
Cast, heavy, No. 1, N. J. points	20.50 to 21.00
Forge, No. 1, eastern Pa.	16.50 to 17.50
Frogs, switches, guards, St. L.	22.00 to 22.50
Grate bars, Buffalo	15.50 to 16.00
Grate bars, N. J. points	15.00 to 15.50
Heavy axle turnings, Buffalo	15.00 to 15.50
Heavy melting steel, Pittsburgh	23.00 to 24.00
Heavy melting steel, Buffalo	26.00 to 27.00
Heavy melting steel, Chicago	21.50 to 22.00
Heavy melting steel, Cleveland	22.00 to 22.50
Heavy melting steel, Cincinnati	19.00 to 20.00
Heavy melting steel, eastern Pa.	22.50 to 23.00
Heavy melting steel, New York	20.50 to 21.50
Heavy melting steel, St. L.	22.50 to 23.00
Heavy melting steel, Birmingham	21.00 to 22.00
Hydraulic pressed sheet, Cleveland	17.50 to 18.00
Hydraulic pressed sheets, Pbgh	18.50 to 19.00
Hydraulic pressed sheets, Chgo	18.25 to 19.25
Iron rails, Chicago	32.50 to 33.00
Iron rails, Buffalo	25.00 to 26.00
Iron rails, Cincinnati	24.00 to 25.00
Iron rails, St. Louis	25.00 to 25.50
Iron rails, Cleveland	29.00
Iron axles, Pittsburgh	39.00 to 40.00
Iron axles, Cincinnati	40.00 to 41.00
Iron axles, eastern Pa.	38.00 to 40.00
Iron axles, Chicago	42.50 to 43.50
Iron axles, Buffalo	45.00
Low phos. steel, Buffalo	32.00 to 34.00
Low phos. steel, Pittsburgh	32.00 to 36.00
Low phos. steel, eastern Pa.	32.00 to 34.00
Machine shop turnings, Buffalo	11.50 to 12.00
Mch. shop turnings, New York	11.00 to 11.50
Mch. shop turnings, Pittsburgh	11.75 to 12.50
Mch. shop turnings, eastern Pa.	13.00 to 13.50
Mch. shop turnings, Birmingham	10.00 to 11.00
Malleable railroad, Cleveland	20.50 to 21.00
Malleable railroad, Buffalo	23.00 to 24.00
Malleable railroad, Pittsburgh	21.00 to 21.50
Malleable railroad, eastern Pa.	18.00 to 19.00
R. R. and mch. cast, No. 1, Bfl.	23.00 to 24.00
R. R. wrought, No. 1, Buffalo	30.00 to 31.00
R. R. wrgt., No. 1, eastern Pa.	26.50 to 27.50
City wrought, New York	21.50 to 22.00
R. R. wrought, No. 1, Pbgh	23.00
R. R. wrought, No. 1, B'ham	21.00 to 22.00
Reroll. rails, 5 ft. & ov., Pbgh	26.00
Reroll. rails, 5 ft. & ov., Chgo.	27.50 to 28.00
Reroll. rails, 5 ft. & ov., E. Pa.	27.00 to 28.00
Reroll. rails, 5 ft. & ov., St. L.	26.00 to 27.00
Shafting, New York	25.50 to 26.50
Shafting eastern Pa.	31.00 to 32.00
Shoveling steel, Chgo.	19.00 to 19.50
Shoveling steel, St. Louis	17.50 to 18.00
Steel rails, short, Chicago	24.00 to 24.50
Steel rails, short, Cleveland	27.00 to 28.00
Steel rails, over 6 ft., Cleveland.	21.00 to 22.00
Steel rails, old, Birmingham	21.00 to 22.00
Steel rails, short, St. Louis	25.50 to 26.00
Steel car axles, Birmingham	36.00 to 37.00
Steel car axles, New York	38.00 to 40.00
Steel car axles, Buffalo	45.00
Steel car axles, Cleveland	49.00 to 50.00
Steel car axles, Pittsburgh	39.00 to 40.00
Steel car axles, eastern Pa.	38.00 to 40.00
Stove plate, N. J. points	15.00 to 15.50
Stove plate, Birmingham	12.50 to 13.50
Stove plate, Buffalo	16.00 to 16.50
Stove plate, eastern Pa.	16.50 to 17.00
Stove plate, Pittsburgh	14.00 to 14.50
Wrought pipe, Buffalo	17.00 to 17.50
Wrought pipe, eastern Pa.	18.00 to 19.00
Wrought pipe, New York	17.50 to 18.00

"Where-To-Buy"

A classified-by-products list of advertisers for the convenience of readers. If you don't find what you want, write us and we will tell you where to get it. ¶ Index to advertisements will give you page number of any advertiser and by referring to advertisement you can get full particulars about products.

ACCUMULATORS.
Biggs-Watterson Co., The, Cleveland, O.
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
Southwark Fdy. & Mch. Co., Philadelphia, Pa.
Tod, Wm., Youngstown, O.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Wood, R. D., & Co., Philadelphia, Pa.

ACETYLENE IN CYLINDERS.
Linde Air Products Co., New York City.
Oxweld Acetylene Co., Chicago, Ill.
Prest-O-Lite Co., The, Indianapolis, Ind.

ADAMITE ROLLS.
Pittsburgh Iron & Steel Foundries Co., Pittsburgh, Pa.

AEROPLANE WIRE, STRAND AND CORD.
American Steel & Wire Co., Chicago, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.

ALLOYS.
American Vanadium Co., Pittsburgh, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Blackwell, Geo. G., Sons & Co., Ltd., Liverpool, Eng.
Bourne-Fuller Co., The, Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Central Steel Co., The, Massillon, O.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
United Alloys Steel Corp., The, Canton, O.

ALUMINUM (Granulated).
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM (Solder).
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM (Vanadium).
American Vanadium Co., Pittsburgh, Pa.

ALUMINUM ALLOYS.
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM INGOTS.
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM RODS (Sheet).
United Smelt'g & Alum. Co., New Haven, Ct.

ANGLES, TEES, CHANNELS (See Steel, Structural).

ANNEALING BOXES AND POTS.
Blackwood Steel Fdy. Co., The, Springfield, O.
Knox Pressed & Welded Steel Co., Pittsburgh.
Mesta Machine Co., Pittsburgh, Pa.
Pittsburgh Annealing Box Co., Pittsburgh, Pa.
Pittsburgh Malleable Iron Co., Pittsburgh, Pa.
Pittsburgh Valve Foundry & Const. Co., Pittsburgh, Pa.
Swedish Crucible Steel Co., Detroit, Mich.
United Engrg. & Foundry Co., Pittsburgh, Pa.
Zanesville Malleable Iron Co., Zanesville, O.

ANTIMONY.
Wah-Chang Mining & Smelting Co., New York City.

ANTIMONY OXIDES.
Wah-Chang Mining & Smelting Co., New York City.

ARCHITECTURAL SHAPES.
Empire Art Metal Co., College Pt., N. Y.

ARMATURES.
Crocker-Wheeler Co., Ampere, N. J.
General Electric Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

ASH BUCKETS.
Lakewood Engrg. Co., Cleveland, O.

AUTO TOWING CABLES.
American Steel & Wire Co., Chicago, Ill.

AUTO TRUCKS.
Federal Motor Truck Co., Detroit, Mich.

AXLES.
American Bridge Co., New York City.
American Steel Export Co., New York City.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Cambria Steel Co., Philadelphia, Pa.
Camden Forge Co., Camden, N. J.
Carnegie Steel Co., Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
National Tube Co., Pittsburgh, Pa.
Otis Steel Co., Cleveland, O.

BABBITT METAL.
Keystone Bronze Co., Pittsburgh, Pa.
Lubricating Metal Co., The, New York City.
Ryerson, Jos. T., & Son, Chicago, Ill.

BAKERS, WIRE COATING.
Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

BALE TIES.
American Steel & Wire Co., Chicago, Ill.

BALLS (Steel).
Bethlehem Steel Co., The, So. Bethlehem, Pa.
New Departure Mfg. Co., Bristol, Conn.

BANDERS (Hydraulic, for Projectiles).
Southwark Foundry & Mach. Co., Philadelphia.

BANDS (Steel).
Akron-Selle Co., The, Akron, O.
Carnegie Steel Co., Pittsburgh, Pa.

BARGES (Steel).
American Bridge Co., New York City.

BARRELS, TUMBLING (Wire Nails).
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

BARS (Concrete Reinforcing).
Bourne-Fuller Co., Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Franklin Steel Works, Franklin, Pa.
Inland Steel Co., Chicago, Ill.
Laclede Steel Co., St. Louis, Mo.
Ryerson, Jos. T., & Son, Chicago, Ill.
Trussed Concrete Steel Co., Detroit, Mich.
Upson Nut Co., Cleveland, O.

BARS (Iron and Steel).
American Bridge Co., New York, N. Y.
American Iron & Steel Mfg. Co., Lebanon, Pa.
American Steel Export Co., New York City.
Belmont Iron Works, Philadelphia, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Brown-Wales Co., Boston, Mass.
Cambria Steel Co., Philadelphia, Pa.
Camden Forge Company, Camden, N. J.
Carnegie Steel Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Franklin Steel Works, Franklin, Pa.
Harvey, Arthur C., Co., Boston, Mass.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago.
Illinois Steel Warehouse Co., St. Louis, Mo.
Illinois Steel Warehouse Co., St. Paul, Minn.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Lackawanna Steel Co., Buffalo, N. Y.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Milton Mfg. Co., Milton, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Joseph T., & Son, Chicago, Ill.
St. Louis Screw Co., St. Louis, Mo.
Scully Steel & Iron Co., Chicago, Ill.
Standard Gauge Steel Co., Beaver Falls, Pa.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Trussed Concrete Steel Co., Detroit, Mich.
United Alloys Steel Corp., The, Canton, O.
Upson Nut Co., Cleveland, O.
Westerman & Co., Lockport, N. Y.

BEAMS, CHANNELS AND ANGLES.
American Steel Export Co., New York City.
Belmont Iron Works, Philadelphia, Pa.
Bourne-Fuller Co., Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Empire Art Metal Co., College Pt., N. Y.
Franklin Steel Works, Franklin, Pa.
Illinois Steel Co., Chicago, Ill.
Ryerson, Joseph T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.

BEARINGS (Ball).
New Departure Mfg. Co., Bristol, Conn.

BEARINGS (Vanadium Steel).
American Vanadium Co., The, Pittsburgh, Pa.

BELT CEMENT AND DRESSING.
Graton & Knight Mfg. Co., Worcester, Mass.
Texas Company, The, New York City.

BELT LACING (Leather).
Chicago Rawhide Mfg. Co., Chicago, Ill.
Graton & Knight Mfg. Co., Worcester, Mass.

BELTING (Chain).
Link-Belt Company, Chicago, Ill.

BELTING (Leather).
Chicago Rawhide Mfg. Co., Chicago, Ill.
Graton & Knight Mfg. Co., Worcester, Mass.

BENCHES (Steel).
New Britain Mach. Co., New Britain, Conn.

BENCHES AND FRAMES (Drawing).
Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., The, Cuyahoga Falls, O.

BENDING AND STRAIGHTENING MACHINES.
Abramsen Engrg. Co., Pittsburgh, Pa.
Bertsch & Co., Cambridge City, Ind.
Birdsboro St'l Fdy. & Mch. Co., Birdsboro, Pa.
Cleveland Punch & Shear Works Co., Cleveland, O.
Espen-Lucas Machine Works, Philadelphia, Pa.
Hinman, D. A., & Co., Sandwich, Ill.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Lourie Mfg. Co., Springfield, Ill.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Niles-Bement-Pond Co., New York, N. Y.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

BENZOL RECOVERY PLANTS.
Koppers, H., Co., Pittsburgh, Pa.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above